IRON AND COAL
TRADES REVIEW

Vol. 181 December 2, 1960 No. 4,820

# Confidence in Coal

MR. RICHARD WOOD'S declaration of faith in the coal industry and his estimate of requirements in the later 1960s are in refreshing contrast with the somewhat pessimistic forecasts made by the National Union of Mineworkers. A deputation from the NUM which saw the Minister of Power on November 2 placed before him a memorandum which suggested that total energy requirements in this country in 1965 would be no more than 280,000,000 tons of coal equivalent, with coal's share in the region of 180,000,000 tons.

The Minister does not accept these figures, and he said so in a written reply to the NUM's memorandum released this week (see p. 1203). His estimate of annual inland energy needs later in this decade is 300,000,000 tons of coal equivalent, and adding export possibilities to inland coal requirements he sees no justification for thinking that the mining capacity needed in 1965 will be significantly less than 200,000,000 tons a year. This, he points out, is the lower end of the range given in the National Coal Board's revised plan, which the NUM suggested had been made meaningless by forecasts based on recent trends. In support of his estimates Mr. Wood was able to point to an increase this year in inland coal consumption of 6,000,000 tons, compared with 1959. He does not regard the 1956-59 period as a good guide for the future. During those four years there was a temporary standstill in economic growth; compared with 1956, 1959 was an exceptionally warm year; and the recovery of the steel industry did not get under way until the latter part of 1959. These and other factors sent the 1959 inland energy consumption down to 246,000,000 tons of coal equivalent—8,000,000 tons below the 1956 level.

To budget for a percentage, if not an actual decline in coal consumption in a period of expansion in world economy generally would be to adopt a defeatist attitude. It is true that at the moment world trade and industry present a number of uncertainties, that the Stock Exchange is in hesitant mood, and that our balance of payments position is not all that the Government would like it to be. But there are hills and valleys in the most persistent expansion curve, and he is an extreme pessimist who does not look for continued economic growth in the long term and a consequent increase in energy needs. The NUM does not, in point of fact, take a particularly pessimistic view of general prospects; its complaint is that while recently there has been economic recovery and growth, production in the coal-mining industry was still being cut back. No doubt the union accepts the Minister's statement that this year there has been an increase of 16,000,000 tons in inland energy consumption in terms of coal equivalent. This is the largest increase that has ever taken place in a period of 12 months, and brings total consumption for 1960 to an estimated level of not less than 262,000,000 tons coal equivalent.

Why assume that 280,000,000 tons is the limit for 1965, as the NUM assumes in its memorandum? Obviously, what the miners are concerned most about is not so much the total level of energy demand as the proportion likely to be filled by oil. They point to the fall in manpower in the industry and assert that the trend will not be reversed unless confidence can be restored, and this, they maintain, can only be done by a change in Government policy. And the policy change the miners want is one that would restrict the growth of oil consumption.

This is a change that others in the coal industry would welcome besides the miners, but it is one against which the Government has evidently set its face. "I cannot see that the costs and inconveniences which this would impose on fuel consumers would be justified by any realistic assessment of the prospects which lie ahead of the coal industry," the Minister says in his reply to the NUM. This statement does not obviously and definitely close the door to future action along the lines so ardently desired by the miners. What it does imply is a belief in Government circles that the coal industry is on its way up again. The NUM has stated that it has no desire to "talk down" the industry, and in this statement it is undoubtedly sincere. Nevertheless, some of the recent speeches made by miners' leaders hardly conduce to inspiring that confidence in the future of the industry which is so obviously essential and which the NUM itself says is so important. The Minister administers a mild rap over the knuckles when he says that the manpower position cannot be expected to improve "if mistakenly pessimistic views, unjustified by the figures of production and demand, are spread abroad about the industry's future."

It is to be hoped that Mr. Wood's reply to the NUM will allay most of the fears in regard to the future expressed on the miners' behalf. Confidence in the future is essential if the industry is to discharge the task before it, and that con-

fidence must be held strongly throughout the mining community, which embraces the members of the National Coal Board and all its employees at headquarters and throughout the coalfields. There are enough people outside the industry and trade ready—and sometimes seemingly anxious—to denigrate coal to make the task of rehabilitating the industry in the public mind difficult enough. Mr. Richard Wood expresses his conviction that the figures of present production and likely demand are a sound basis for confidence in the future. If the industry, and all those engaged in it, move forward together in the same firm conviction they will carry the public along with them. The public are the consumers, and public goodwill is perhaps more essential to success in the coal industry today than ever before in its history.

## Miners' Pay Claims Could Cost £20,000,000 a Year

CLAIMS for pay increases of 18s. a week for 340,000 day-wage men and £1 10s. for 55,000 colliery craftsmen were presented to the National Coal Board by leaders of the National Union of Mineworkers on Wednesday. The NCB's reply will be given after Christmas, probably early in January.

With consequential increases for pieceworkers, the increases would cost the board about £20,000,000 a year if conceded in full.

In support of the claims, the NUM argued that productivity had improved and miners should share in the benefits, that miners' pay was falling behind that paid to workers in other industries, that men were leaving the pits or failing to enter them because of the higher wages elsewhere, and that the arbitration award of another 5s. a week last September was far below negotiated wage advances in other industries.

Mr. S. Ford, president of the NUM, said after the meeting, that when the industry was nationalized miners were among the highest-paid industrial workers. They were now eighth on the list. Productivity had risen by 10 per cent. in the last three years. The "miserable" award of 5s. a week had caused great resentment in the coalfields.

## *Machine-tool Orders Near £100,000,000*

WITH orders worth nearly £100,000,000, the machine-tool industry's September bookings are one of the highest in its history. There is, however, some uncertainty whether the order-book figures will rise further since there has been an appreciable decline in ordering from the consumer durable industries.

Net new orders received from UK customers in September, the last month for which figures are available, stood at £8,000,000, compared with £8,400,000 in August, and £11,000,000 in July. In September deliveries to the home market totalled £6,600,000, and export deliveries totalled £2,300,000.

## *Passing Thoughts . . .*

IF the results of research and of new scientific ideas were to be incorporated in the design of new products or in improved processes of manufacture there must be among the managers and senior staff of the firms themselves men capable of understanding them and of translating them into practice . . . that is where many branches of Britain's engineering industry fall down.—MR. AUSTEN ALBU, MP, speaking in the BBC's Third Programme.

> *It is possible that British industry still has an "amateur" outlook on affairs. I think we must get away from the idea that what may be proper and nice in golf must also obtain in business. In a game between amateurs and professionals it is the professionals who usually win.*—MR. H. P. BARKER, *chairman of the council of the British Institute of Management.*

Unless health education is properly conducted we may create a reign of terror for executives, a haunting fear that coronary thrombosis, high blood pressure, or some other disorder is lurking just around the corner. —DR. I. G. NORMAN, speaking at the second conference organized by the Chest and Heart Association on the Health of Executives.

> *We now send a bus to take a child a quarter of a mile to school where milk is poured down its throat so that it can only manage a plateful of ice-cream for its dinner, after which it is conveyed home to sit in front of a television to watch Lady Loverley's Chatter. The half-starved brat playing on the bomb site is perhaps as happy and probably more healthy.*—DR. HUGH SINCLAIR, *Magdalen College, Oxford, another speaker at the conference.*

Managers of high skill with wide knowledge and ripe experience are not so plentiful that we can afford a premature failure of their powers through ill-health, or run the risk of the early termination of their lives.—SIR GODFREY INCE, chairman of Cable & Wireless, Limited, who also spoke at the conference.

> *The cost* [*of accidents*] *to the country is* 20,000,000 *man-days a year or the equivalent of* 60,000 *persons permanently on strike.*—MR. F. W. THOMPSON, *Superintending Inspector of Factories* (*Scotland*), *speaking at the annual dinner of the Glasgow branch of the Institution of Plant Engineers.*

It has been suggested that there should be Government subsidies for firms which train more, or that the Government itself should undertake the training of substantial numbers of skilled craftsmen. I would be sorry to see any change in the basic division of functions but if industry fails to meet the challenge of the "Bulge," the demand for Government action might be hard to resist.—MR. JOHN HARE, Minister of Labour.

> *It is doubtful whether a restraint on domestic demand does in fact encourage exports. The evidence points in the other direction as lower overall production means higher costs and a weaker competitive position in world markets.*—MR. IAN W. MACDONALD, *chairman of the National Commercial Bank of Scotland, Limited.*

UNITED WIRE WORKS, LIMITED—The dividend is raised to 20 (15) per cent. for the year ended October 1.

# Iron Castings' Production

## *RECORD RESULT FOR THIRD QUARTER*

REVIEWING the Iron and Steel Board's production figures for iron castings for the third quarter of 1960, the Joint Iron Council points out the significance of the firm situation in the manufacture of castings for the engineering industry where the current buoyancy of capital investment is exerting its effect. In the automobile section the easing of demand for vehicles which has taken place was not generally reflected in the automobile ironfounders' production up to the end of September. The high rate of activity maintained in the steel industry is shown in the production of ingot moulds, and a marked increase in the railway section reflects one of the periodic fluctuations of requirements under the modernization programme.

Because of holidays and their effect on production, a valid comparison of the third quarter of a year can only be made with the third quarter of a previous year. However, after steadying slightly in the second quarter of 1960, ironfounding production, allowing for seasonal changes, appears to have moved forward and has established a record third quarter level. Compared with 802,200 tons in the third quarter last year, this year's figure of 903,700 tons represents an increase of nearly 13 per cent. in the total output of iron castings.

The output of iron castings for building and domestic use was approximately the same as in the third quarter last year. The production of pressure pipes and fittings was slightly lower, but for all other sections a marked increase is recorded. The ironfounding industry's success is shown, too, in the increase in the number employed. At the end of September the figure was 131,300. This is 1,400 more than three months ago and 6,400 more than at the end of September last year.

### Iron and Manganese Record ?

District production figures given by the Iron and Steel Board for July-September, 1960 (with the corresponding figures in parentheses), were:—

Eastern, south-eastern (including London), southern and south-western, 102,250 (91,840) tons; Midland, 203,400 (185,610) tons; north Midland, 185,730 (174,150) tons; East and West Ridings, 82,780 (76,590) tons; north-western, 85,040 (74,400) tons; Northern, 103,150 (81,760) tons; Scotland and Northern Ireland, 82,790 (72,030) tons; Wales, 58,570 (45,800) tons.

This is likely to be a record year for iron and manganese ore imports on the East coast, the Middlesbrough office of the British Iron and Steel Corporation (Ore), Limited, announced last week. While it is evident that the usual seasonal decline is now beginning to take effect, the general level of all deliveries is well above that for last year.

Iron and manganese ore arrivals in Middlesbrough during October amounted to 380,217 tons, and at the Hartlepools 79,957 tons. In the whole of Britain the month's figure was 1,611,000 tons. Comparative figures for 1959 are 232,880 tons, 32,092 tons, and 1,341,000 tons, respectively.

## *Two Steel Tube Plants For India*

DETAILS have been announced of two new steel tube plants to be built in India within the framework of the country's third five-year plan, during which five tube plants are to be built. One of the new projects is to be built near Bombay by the newly-formed Zenith Steel Pipes, Limited, at a cost of Rs. 12,500,000. It will produce some 24,000 metric tons of welded steel tubes annually.

The Industrial Credit and Investment Corporation of India has given its basic consent to grant Zenith Steel Pipes a foreign currency loan of Rs. 4,000,000 for equipping the plant. The second plant is a project of Bharat Steel Tubes Pty., Limited, which will be built in North India to produce 36,000 tons of steel tubes a year.

## John Brown to Make Steelworks Plant

PURSUING its policy of diversification, John Brown & Company, Limited, shipbuilders and engineers, of Clydebank, is to enter the field of steelmaking equipment for the first time. Its subsidiary John Brown (S.E.N.D.), Limited, which was formed at the end of last year to co-ordinate the company's special engineering and nuclear activities, has signed an agreement with Demag, the German engineering group, for the manufacture and supply in the UK of a wide range of iron and steel works plant to Demag designs.

Demag is among the world's leading suppliers of steel-rolling equipment.

## Furnace Rebuilding Record Beaten

WORKING day and night, a team of 300 at the Redbourn steelworks, Scunthorpe (Lincs), has completely rebuilt, from the concrete foundations, an open-hearth steel furnace in 15 days. They lowered the previous record, the rebuilding of "B" furnace last year, by a full day.

The first tap of molten steel from the newly-built "D" furnace, re-lighted by Mr. Edward Davey, manager of the building department, was tapped last Friday.

## Obituary

### MR. W. H. TAGG

FORMER member of the national council of the National Association of Colliery Managers and a past president of the Yorkshire branch, Mr. William Henry Tagg, died on Monday. He was 69. A native of Nottinghamshire he started his long career in mining at Pilsley and Penrich collieries and after the first world war, in which he served with the Sherwood Foresters, he went to Teversal Colliery where his father was manager.

In 1921 he was in charge of the installation of the first mechanized face at Teversal and when coal was reached at Clipstone he went there as undermanager. In 1927 he helped open up another pit when he was appointed assistant to the manager during the sinking of Thoresby Colliery. There, too, he became undermanager, a post he held for nine years. He moved to Yorkshire in 1936 as manager of Frickley Colliery and became agent in 1941. After nationalization he was appointed "B" sub-Area production manager in the No. 4 (Carlton) Area of the North-Eastern Divisional Coal Board. He retired in 1954 and went to live at Blyth, near Worksop, and from there carried out some consultancy practice.

During his time in Yorkshire Mr. Tagg was well-known for his musical interests and helped to reorganize Carlton Main-Frickley Colliery brass band, now one of the leading brass bands in the country. He was an authority on poultry and a frequent judge at shows and he was also a connoisseur of pottery, particularly Wedgewood. Up to his retirement he served as divisional superintendent of the Frickley Colliery and District division of St. John Ambulance Brigade. His association with the British Legion since its formation in 1918 lasted up to his death, being recently re-elected chairman of the South Elmsall branch.

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The death has occurred of Mr. VICTOR EMANUEL, a director of the Republic Steel Corporation and other US companies. He was 62.

The death occurred last Friday of Mr. R. W. COX, commercial manager of Telehoist, Limited, manufacturers of hydraulic tipping gear, of Cheltenham (Glos).

The death has occurred of Mr. J. W. CAMPBELL, who was for many years an engineer and surveyor in collieries in the Woodland (Co. Durham) area. He was 88.

The death has occurred, at the age of 44, of Mr. FREDERICK BERTRAM MARTIN. Since leaving school he had been a member of the staff of the Lilleshall Company, Limited, structural engineers, of Oakengates (Salop), and last year was appointed merchanting manager of the subsidiary, the Fairmile Engineering Company, Limited.

The death has occurred of Mr. JOHN E. STRACHAN, deputy Area production manager (planning), of the Warwickshire Area of the West Midlands Divisional Coal Board. He was 54. Mr. Strachan was formerly manager of Pooley Hall Colliery and had a long and active association with the National Association of Colliery Managers. In 1946-47 he was president of the South Staffordshire branch of the Association.

## Giant Walking Dragline at Scunthorpe

ERECTION of one of the world's largest walking draglines begins this week at the Roxby open-cast ironstone mine, Scunthorpe, of the ore mining branch of the United Steel Companies, Limited. The £900,000 machine, the Rapier W1800, will be capable of stripping up to 30 tons of overburden at each "bite," shifting its own weight of material every hour, and it can be entirely controlled by one man.

The depth of the overburden at the Roxby quarry varies from 50 ft. to 150 ft., and this has to be removed in order to gain access to the ironstone bed. At present, existing equipment at Roxby is producing an average of about 5,000 tons of ironstone per week for use in the blast furnaces of Appleby-Frodingham Steel Company. When the W1800 is in operation early in 1962, it will enable this figure to be doubled to a weekly average of 10,000 tons.

Designed and built by Ransomes & Rapier, Limited, the W1800, which is electrically driven, is the second of these large walking draglines to be purchased by the ore mining branch of United Steel. The first, a Rapier W1400, has been in operation at the Exton Park open-cast ironstone mine near Stamford since mid-1957.

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## *Nuclear Power's Need for Higher Strength Steels*

FULL benefits of nuclear power could not be realized so long as the engineer was limited by the materials available to him, and if suitable steels were not available, the nuclear engineer might have to explore alternative materials, Sir Leonard Owen, member of the UK Atomic Energy Authority for Production, told the British Nuclear Engineering Conference on Wednesday. Designers of reactors felt that they were entitled to look to the steel industry for a lead to the solution of this problem, he said.

Sir Leonard estimated that it was possible to show a reduction of 2½ per cent. in the cost of a unit of elecrical power sent out from a 250 mW. station by substituting a steel with a 36-ton specification in place of the 28-ton steels now available. Higher strength steels were particularly attractive if large stations of the Calder Hall type were developed, and with regard to reactors of the advanced gas-cooled type, there was great scope for improvement arising from the availability of higher strength steels.

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## ENGLISH ELECTRIC—GEC MERGER OFF

MERGER negotiations, begun two months ago, between the English Electric Company, Limited, and the General Electric Company, Limited, have been discontinued. Combined net assets of the two groups are about £177,000,000, which would have made it the biggest merger ever of two industrial companies in Britain, as well as forming the largest electrical group.

No official explanation for the breakdown of the talks has been given.

# Minister Hits at "Pessimism"

## TUC MAY MEET CABINET ON FUEL POLICY

"UNJUSTIFIABLY pessimistic" estimates which had been put forward recently about the total amount of primary fuel, and of coal which is likely to be needed in the future, together with the suggestion that such estimates meant that the National Coal Board's Plan for 1965 was "meaningless," are rebutted by the Minister of Power, Mr. Richard Wood, in a statement published on Tuesday in reply to the memorandum on fuel policy submitted by a deputation of the National Union of Mineworkers to the Minister on November 2.

Leaders of the Trades Union Congress are now expected to seek a meeting with the Prime Minister and members of the Cabinet soon after Christmas to press their demands for a national fuel policy. Mr. W. Paynter, general secretary of the NUM, said on Tuesday that a proposal for such an approach would be put before the December meeting of the TUC General Council by the production committee, and would almost certainly be accepted.

The production committee decided on this course after miners' leaders had told it of the Minister's statement in reply to the NUM's suggestions on fuel policy. This reply, Mr. Paynter asserted, evaded the main points which the union had raised and had not answered its specific questions about the Government's estimates of fuel demands in 1965 and what share the coal industry was to have in supplying them.

### Union "Too Cautious"

The NUM memorandum suggested that total energy requirements in 1965 would be in the region of 280,000,000 tons of coal equivalent, and "nowhere near the figure officially stated by the Government of 300,000,000 tons." The share of oil on recent trends would expand to about 90,000,000 tons of coal equivalent, and the share of coal would decline to the region of 180,000,000 tons. "If this forecast is reasonably accurate, then it means that the NCB's plan for 1965 is meaningless," the memorandum stated.

In his statement, the Minister says that these views had been largely based on the experience of the years 1956-59, during most of which time there had been a temporary standstill in economic growth. This year, however, there had been an increase of 16,000,000 tons, the largest that had ever taken place, and total energy consumption was likely to be not less than 262,000,000 tons coal equivalent. Coal had shared in this increase; inland consumption this year looked like being about 196,000,000 tons—6,000,000 tons more than 1959.

The Minister continues: "It would be foolish to claim precision for forecasts, but my present estimate of annual inland energy needs in the later 1960s is about 300,000,000 tons of coal equivalent; I consider too cautious the union's 1965 figure of 280,000,000 tons, and its estimate of an inland demand of 182,000,000 tons of coal. An allowance must be added to the inland coal requirements, and I see no justification for thinking that the mining capacity needed in 1965 will be significantly less than 200,000,000 tons.

"This is the lower end of the range given in the National Coal Board's Revised Plan, and it is the figure to which the board is at present working. For these reasons I cannot accept the NUM's description of the Revised Plan as meaningless."

In recent weeks, says the Minister, the rate of deep-mined coal production had been little more than 183,000,000 tons a year. The rate of total output, including open-cast sites, had been not much over 190,000,000 tons a year. This suggested that there was no longer any need to fear that deep-mined output would be in excess of demand. "Even on the union's estimate of an inland demand of 182,000,000 tons in 1965, which I have already said in my view is too low, the prospect is one of stable and possibly increasing needs."

Mr. Wood says that the NUM deputation which discussed fuel policy with him on November 2 rightly stressed the dangers of a continuation of the rate of loss of colliery manpower that had occurred during the last three years. This loss originated in a deliberate policy of restricting recruitment in order to adjust output to a lower level of demand with the least harm to the workers of the industry. But once the necessary adjustment had been made, the NCB resumed active recruitment in those divisions where there had been restrictions. Since then there had been a marked reduction in the loss of men, and it was essential that this improvement should be maintained.

"The fact that future demand is likely to equal, if not exceed, production should provide a firm basis of confidence in the future; but the manpower position cannot be expected to improve if mistakenly pessimistic views, unjustified by the figures of production and demand, are spread abroad about the industry's future."

Replying to the suggestion in the NUM memorandum that in the first 10 years of nationalization, when coal was in short supply, prices could have been at least £1 a ton higher and the board could have accumulated a surplus of over £2,000,000,000, the Minister says that such increases would have been widely resented by the general public

They would also have reduced the industry's incentives to bring down its costs, raised the general price level, including the price of manufactured goods, and the cost of living, and been detrimental to exports and the balance of payments.

Against the loss of £70,000,000 on imports referred to in the memorandum, it should not be overlooked that exports had brought the National Coal Board a total profit of well over £100,000,000, says Mr. Wood. He adds: "It is not correct to say that the Government has given no financial assistance to the board. With the sanction of Parliament, it has ad-

vanced the necessary capital at interest rates below what the board would have had to pay in the open market."

Referring to the measures for assisting the industry listed by the NUM, the Minister says it is the Government's policy to encourage industry, by means of grants and loans, and by the control of the siting of new factories, to develop in areas in which serious local unemployment exists or threatens. The very low unemployment among miners was proof of the great care exercized by the NCB in planning closures of exhausted and uneconomic collieries.

On the question of placing restrictions on the growth of oil consumption, he could not see that the costs and inconveniences which this would impose on fuel consumers would be justified by any realistic assessment of the prospects which lay ahead of the coal industry. As to the use of oil at power stations, the modifications which had been made to the programme had reduced the scale of the conversion by not much less than half, and the Government was not prepared to press the electricity authorities to go further, at the cost of setting contracts aside.

## Personal

Mr. T. H. BURLEIGH, managing director of Firth Brown Tools Limited, Sheffield, last Friday presented awards to over 160 workers and apprentices.

Regarded as one of the Labour party's rising men, 51-year-old Mr. RAY GUNTER, president of the Transport and Salaried Staffs' Association, takes over as shadow Minister of Power from Mr. Fred Lee.

At the annual general meeting of the Junior Institution of Engineers last Friday Mr. E. E. BURRAGE was elected chairman and Mr. J. P. McKenna, and Mr. R. W. Winterborne were elected vice-chairmen.

At the invitation of the Soviet Government, Mr. S. P. CHAMBERS, chairman of Imperial Chemical Industries, Limited, flew to Russia last week on a fact-finding tour. This is Mr. Chambers' fourth visit to the countries of eastern Europe in little more than a year.

Mr. JAMES MCWATERS STOREY is resigning his position as managing director of Dewrance & Company, Limited, at the end of the year in order to devote more time to his personal interests, particularly in the domestic boiler field. He is also a director of Sunrod Industrial, Limited, and chairman of Jones, Tate & Company, Limited, and a director of the British Engineers' Association.

Sir ALEXANDER FLECK, former chairman of Imperial Chemical Industries, Limited, was elected treasurer of the Royal Society at the anniversary meeting of the society in London on Wednesday. Sir PATRICK LINSTEAD, Rector of the Imperial College of Science and Technology, was elected foreign secretary, and Dr. C. J. STUBBLEFIELD, assistant director of the Geological Survey of Great Britain, was elected a member of council.

Further gift of £35,000 to Sheffield University to provide more recreational facilities was announced by Sir STUART GOODWIN, chairman and managing director of Goodwin & Company, Limited, crucible steel manufacturers, of Sheffield, and president of the Neepsend Steel & Tool Corporation, Limited, when he opened the university's £80,000 gymnasium last week. Sir Stuart and Lady Goodwin have already given £30,000 towards the cost of the gymnasium and are meeting the cost of a £60,000 swimming pool.

# *Mr. C. R. Wheeler Rejoins SCOW Board*

AFTER a period of 13 years Mr. Charles R. Wheeler has rejoined the board of the Steel Company of Wales, Limited. Announcing his reappointment on Wednesday, SCOW also announced that Mr. Michael J. Layton, the company's sales controller, had joined the board.

MR. C. R. WHEELER

Mr. Wheeler, who is 56, is chairman of Guest Keen Iron & Steel Company, Limited, chairman of Associated Electrical Industries, Limited, and a director of several steel and allied companies, including the British Iron & Steel Corporation, Limited, Brymbo Steel Works, Limited, and John Lysaght's Scunthorpe Works, Limited. He has spent his entire career in iron and steel. He joined Baldwins, Limited, in 1922 and a year later transferred to the Margam works. He was London manager of Baldwins until the formation of Guest, Keen & Baldwins, Limited, in 1930, when he was appointed assistant commercial manager, later becoming commercial manager.

In 1939, at the outbreak of war, he went to the Iron and Steel Control. In 1943, he headed the UK delegation to the Joint Metallurgical Committee in America, which considered and reported on alloy steel and alloy conservation. He became deputy controller (raw materials) in 1943, and controller of iron and steel in 1945.

In May, 1946, Mr. Wheeler returned to Guest Keen Baldwins as joint managing director. He became a director of SCOW on its formation in 1947, resigning in 1952 on a reconstruction of the board following nationalization. He was president of the Iron and Steel Institute for the year 1958/59 and is president-elect of the British Iron and Steel Federation.

Mr. Layton is a qualified engineer, having gained an honours degree in mechanical sciences at Cambridge. A student apprentice at the British Thompson Houston Company, Limited, Rugby, from 1939 to 1943, he was works manager and production engineer with Ibbotson Bros. & Company, Limited, Sheffield, after which he spent three years as manager of two armoured car production plants for Rootes, Limited.

In 1946, Mr. Layton became a member of the British Control Commission in Germany and served on various international bodies until 1948, when he joined the British Iron and Steel Federation, for which he represented the industry at all meetings of the Economic Commission for Europe's Steel Committee. In 1955, he joined Guest, Keen Iron & Steel Company, Limited, temporarily to assist in its development projects. He became sales controller of SCOW in 1956.

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BURMA IS TO BUY STEEL from Communist-dominated North Korea under a trade pact now signed between the two countries

## *In Parliament*

# NO "BLACKMAIL" BY RTB

## Effect of Expenditure on Ironstone Inquiry

SUGGESTIONS that heavy expenditure had been incurred by Richard Thomas & Baldwins, Limited, on iron ore plant at Newport (Mon) in order to " blackmail " the Minister of Housing and Local Government into a favourable decision over the company's application to mine ironstone in north Oxfordshire, were refuted by the MINISTER OF POWER, Mr. Richard Wood, in the House on Monday. " If the decision were to go against the company, it will have incurred very little nugatory expenditure," said Mr. Wood.

In reply to MR. NEIL MARTEN (Con.), who asked how much money had been spent by RTB on capital development at Newport for the specific purpose of receiving and handling Oxfordshire iron ore, MR. WOOD said he understood the company had spent about £250,000 and was committed to spend a further £1,350,000 for this purpose. " But I am told that the plant can, if necessary, handle ore from other sources."

MR. MARTEN asked why the expenditure was authorized before the result of the public inquiry was announced, and did the Minister not think that possibly RTB was trying to influence the result of the inquiry? MR. WOOD retorted that if it was suggested that this expenditure was incurred in order to blackmail the Minister of Housing and Local Government, then anyone who knew the Minister would know that this would be ineffective.

### Need to Make Plans

MR. WOOD added that the company was in the position that it had to make plans in order to be in time to receive ore, and he had been told by the company that if the decision were to go against it, there would be incurred very little nugatory expenditure.

MR. MARCUS KIMBALL (Con.) said that many people felt that provided the price of imported foreign ore was kept within reasonable bounds by the supplying companies, there was very little justification for further exploitation of the open-cast iron-ore mining in the Midlands, and that these valuable seams should be kept as a strategic reserve. MR. WOOD replied that this was a matter for the inquiry to decide.

### COAL QUALITY GROUPING

QUESTIONED by MR. WILLIAM WHITLOCK (Lab.) on when he expected to receive from the coal trade proposals for ensuring that coal was sold in accordance with recognized quality groupings, the MINISTER OF POWER, Mr. Richard Wood, said he could not give a date, but was sure that the trade appreciated the need to move quickly.

MR. WHITLOCK stressed that every day there was delay in taking action in this matter, some consumers were being swindled and the coal trade was being unfairly handicapped in its competition with other fuels. MR. WOOD, in reply, drew attention to the small number of coal merchants whom the Domestic Coal Consumers' Council had in mind when it made its recommendations on quality groupings. He was, however, most anxious to get proposals from the trade as soon as possible, and hoped they would not be long.

### GASIFICATION DEVELOPMENT

BOTH the National Coal Board and the Gas Council agreed with the Wilson Committee on Coal Derivatives that, in the field covered by its terms of reference, coal was likely to derive the greatest benefit from the improvement of existing methods and the development of new methods of gasification, the MINISTER OF POWER, Mr. Richard Wood, told MR. ALAN FITCH (Lab.).

MR. WOOD added that he agreed with this view, and was discussing with the two industries the best means of giving effect to the committee's recommendation about work on slagging gasifiers. He accepted the other recommendations on organization, which dealt with work on other gasifiers and on producer gas plants.

In reply to a further question from Mr. Fitch, the MINISTER said that the Gas Council was well aware of the importance of the Lurgi gasification process. " I hope that the Lurgi plant in Fife will begin operating next year and that substantial progress will quickly be made with the other Lurgi plant."

### FUEL FROM PITHEAPS

NO SPECIAL directive had been given to the Central Electricity Generating Board in regard to research into the extraction of fuel from derelict pit heaps, said MR. JOHN C. GEORGE, Parliamentary Secretary to the Minister of Power, in a written answer to Mr. Roy Mason (Lab.).

MR. MASON referred to the potential success of the generating board in extracting fuel from derelict pit heaps, and asked if the Minister would direct the Coal Board to consider surveying all abandoned heaps with a view to the power producing industries jointly taking full advantage of this waste, and also helping to clear the mining districts of dirt tips.

MR. GEORGE replied that the working of old pit heaps was highly speculative, and action was best left to local initiative.

ASKED by Mr. Ron Ledger (Lab. and Co-op.) if the Minister was aware of a widespread shortage of coal and if he would direct the Coal Board to take urgent

action to remedy the situation, the Parliamentary Secretary to the Minister of Power denied that there was any general shortage of coal.

INITIAL response by employers to the offer of apprentice training schemes in Government training centres had been slow, said the Minister of Labour. At present 85 firms were taking part and 120 boys were in training.

COKE PRICES, like those of other fuels, were best settled by competition between sellers, said the Parliamentary Secretary to the Minister of Power, when asked by Mr. Marcus Lipton (Lab.) whether in view of the high price of coke sold in 28 lb. bags he would take powers to control the price of coke sold in this way.

IN CONSULTATION with his Advisory Council on Research and Development, the Minister of Power was considering carefully the scope for intensifying research and development on all forms of coal utilization, but was not yet ready to announce his conclusions, said the Parliamentary Secretary to the Minister of Power, in a written answer to Mr. Arthur Skeffington (Lab.).

FIGURES showing the change in the index of industrial production over recent years were given by the President of the Board of Trade, in a written reply to Mr. Ellis Smith (Lab.). Taking the 1954 index as 100, they were: All industries, 1948—79, 1958—106, 1959—113, 1959 (first nine months)—110, 1960 (first nine months)—119; Engineering and allied industries, 1948—74, 1958—112, 1959—120, 1959 (first nine months)—116, 1960 (first nine months)—127.

## *Second Inquiry into Ironstone Working*

IRONSTONE working in an area west of Bloxham (Oxon) would have the long-term effect of improving the landscape, said Mr. J. R. Bickford Smith, QC, at a public inquiry last week at Banbury. Mr. H. F. Yeomans, a Ministry of Housing and Local Government inspector, opened this second ironstone inquiry, this time to consider an application by McGregors, Limited, Manchester, to work Oxfordshire ironstone in an area of 100 acres. Last week Mr. Yeomans closed an eight-day inquiry into applications by Richard Thomas & Baldwins, Limited.

For McGregors, Mr. Bickford Smith said that the important difference between the inquiry and the previous one was that the area had already been developed and was not very attractive. "It is not good agricultural land of any outstanding beauty," he added. The company proposed to work 65 acres. Some 25 acres of the land had already been worked. The ore reserve had been estimated at 1,500,000 tons. It would be worked over five to six years, with an output of 3,000 to 5,000 tons a week.

Mr. F. P. David, McGregor's chief engineer, said it was proposed to continue working the quarry, which had been left with about 55 unworked acres. The scheme was a good commercial proposition. The site was relatively easy to work, especially because the railway sidings were so close to the site. Questioned by Mr. R. V. Cusack, QC, representing Oxfordshire County Council, the main objectors, he said his company had no experience of ironstone mining, only of open-cast coal mining. He agreed that the ironstone would provide work for machinery at present being used on open-cast work, which was dying.

## *Appointments*

Mr. W. E. ALDRED has been appointed chief engineer of Joshua Bigwood & Son, Limited, engineers, of Wolverhampton.

Mr. T. E. GREENFIELD has been appointed sales development manager of the industrial process control division of Gresham Automation, Limited, Hanworth (Middx).

Mr. E. T. REED has been appointed general sales manager of Penney & Porter, Limited, electrical, mechanical, and constructional engineers, of Lincoln. He succeeds Mr. T. J. Rivers who has resigned because of ill health.

Mr. W. E. HIND has been appointed manager (home sales) of British Insulated Callender's Cables, Limited. He joined the former Callender Company, Limited, in 1920 and before his new appointment was deputy manager (home sales).

The executive committee of the National Association for Rolled and Re-rolled Steel Products has appointed Mr. W. SMITH, as secretary of the association, to succeed Mr. R. T. Tarrant, who retired on Wednesday. Mr. D. HAMMOND has been appointed assistant secretary.

Mr. A. F. MILLER and Mr. S. McD. GEMMELL have been appointed managers of the Glasgow and Aberdeen branches, respectively, of British Insulated Callender's Cables, Limited. Mr. Miller joined the former Callender's Cable & Construction Company, Limited, at Edinburgh in 1938, and was appointed branch manager in Aberdeen in 1957. He succeeds Mr. H. THOMSON, who has been released for specialist duties with BICC's north-east regional manager. Mr. Gemmell joined the former British Insulated Cables, Limited, in 1940 and before his new appointment was a sales representative attached to the Aberdeen branch.

The Minister of Power has appointed Mr. M. P. MURRAY to be a deputy secretary in the Ministry in succession to Sir Reginald Ayres, who is retiring from the public service on January 2, 1961. Mr. Murray transferred to the Ministry of Fuel and Power in 1946 from the Air Ministry. He was appointed under secretary in charge of the electricity division in 1947 and has been director of establishments in the Ministry since 1959. On the retirement of Sir Reginald, Mr. M. FLETT will be the deputy secretary responsible for the divisions in the Ministry dealing with coal, petroleum, and economics and statistics. Mr. Murray will be responsible for the Ministry divisions dealing with electricity, gas, iron, steel, and safety and health in mines and quarries.

## Setback for Engineering Wages Scheme

COLLAPSE of a scheme for a new wage structure for the engineering industry is understood to have followed a difference of opinion between leading engineering employers. A committee of the Engineering and Allied Employers' National Federation has been working on the scheme for the past six years. Mr. J. J. Gracie, a director of the General Electric Company, Limited, has resigned the chairmanship of the committee.

It is believed that opposition to the scheme, which was based on principles worked out by the Midland Engineering Employers' Association, came from a substantial minority of the committee.

# ECSC COAL

## *Fall in Output and Stocks*

TOTAL of 19,470,000 metric tons of hard coal was produced in October in the six countries of the European Coal and Steel Community, compared with 20,500,000 tons in October, 1959; this represents a fall in output over the year of 6.4 per cent. Over the first 10 months of 1960 ECSC coal production totalled 193,810,000 tons, or 0.5 per cent. less than in the same period of 1959. France experienced a fall of 3.2 per cent. over the year, while Holland recorded a production increase of the same volume and both West German and Belgian outputs rose slightly.

Coal stocks in the ECSC countries fell from 32,800,000 tons in October last year to 29,900,000 tons this year. A remarkable fall was reported from West Germany—from 12,600,000 tons to 8,900,000 tons over the course of the year.

The Advocate-General of the European Court of Justice has backed the claim of the Dutch coal-mining industry that the High Authority of the ECSC should forbid the payment of tax-free bonuses to West German mineworkers.

### Duty-free Quota

In another matter concerning Germany, the authority has recommended the Government in Bonn to set the import duty-free quota of foreign coal at 6,000 000 tons, at least, for 1961, while informing other ECSC member Governments of this recommendation and reminding them of their duties regarding the control of coal shipments as far as country of origin is concerned. Since the German Government was considering 6,000,000 tons as a quota in any case, it is expected that the authority's suggestion will be followed.

Some $7,000,000 of the $35,000,000 raised by the latest American loan of the ECSC is to be put aside for satisfaction of application for credit for the setting-up of other industries in coalfields affected by closure schemes. The period in which such applications can be made is to be kept as short as possible by the authority. The remaining 80 per cent. of the loan—or $28,000,000—is to be reserved for use as credit for plant extension and rationalization applications.

West Germany will not be able to share in the money raised by the floating of the loan. In the case of Belgium, which may be expected to be the main beneficiary of the first part of the loan funds, an institute is to be formed at the urging of the Ministerial Council of the Community which will concern itself with the financing of industrial conversion schemes in the coalfields.

The High Authority is continuing the exchange of notes with the French Government on France's coal import body, ATIC. A French note received in Luxembourg earlier this month met with little enthusiasm on the part of the authority, since it showed the unwillingness of the French Government to come to a satisfactory agreement about the powers and existence of the body, and the authority has now requested a new date for the resumption of negotiations.

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UNDER AN AGREEMENT signed in Warsaw, Austria's import coal quota of 1,100,000 tons annually is to be extended for a further year for Polish coal supplies.

## "Waste" At Collieries Denied by NCB

ALLEGATIONS of "bad planning, extravagance and waste" at Backworth and Rising Sun collieries are "emphatically denied" in a statement by Mr. Leslie Graham, chairman of the Northern (N&C) Divisional Coal Board, who adds that the board has a complete answer to the charges. The complaints were made recently by Mr. R. Curran, secretary of the Wallsend branch of the Northumberland Colliery Mechanics' Association, who wrote to the chairman-designate of the Coal Board, Mr. Alfred Robens, suggesting that he should make an investigation at the collieries.

In his reply to Mr. Curran, Mr. Robens stated that there was machinery at local level for investigating complaints of this kind, and suggested that the matter should be pursued through this channel.

Mr. Graham's statement adds that Mr. J. Leathem, general secretary of the National Union of Mineworkers (Northumberland Mechanics Group 1) and representatives of his association had been invited to meet representatives of the divisional board to hear its observations on the complaints. Mr. Leathem had replied that he had no official knowledge of the complaints, but was asking for the necessary information and as soon as he had received this he and his colleagues would meet the board.

## *Easington Colliery Output Achievement*

RAISED and weighed output this year at Easington Colliery (Co. Durham), has exceeded 1,000,000 tons, an accomplishment achieved a month earlier than last year when a post-nationalization record was set up. Other years when 1,000,000 tons were exceeded at this 50-year-old colliery were 1929 and 1930.

Easington, which has been reconstructed, is highly mechanized, and it is hoped that its highest-ever output will be achieved this year.

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TWO THIRDS of a record intake of 172 young men in the past year joined their fathers on the firm of Samuel Fox & Company, Limited, branch of the United Steel Companies, Limited. This was stated recently by the works education officer, Mr. G. J. Cumming, at the annual prize distribution.

*Board Changes*

# Mr. A. L. G. Lindley GEC's New Chairman

WHEN Sir Leslie Gamage retires at the end of the year as chairman of the General Electric Company, Limited, he will be succeeded by Mr. A. L. G. Lindley, the present vice-chairman and managing director. He succeeded Sir Leslie as managing director in July of this year and will continue to hold the appointment in addition to the chairmanship.

Mr. Lindley joined GEC in 1918 and in 1932 was transferred to South Africa where he became chief engineer of the British General Electric Company of South Africa, Limited. Shortly afterwards he was appointed assistant general manager of that company. He returned to the parent company in 1949 to take up duties as general manager of the heavy mechanical engineering works at Erith and became a director in 1953.

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HALL-THERMOTANK, LIMITED—Mr. F. I. Geddes has joined the board.

J. I. CASE COMPANY, LIMITED—Mr. J. P. Featherstone, director of home sales, has been appointed to the board.

BIRFIELD, LIMITED—Mr. B. P. R. Parsons, Mr. W. E. Sparrow, and Mr. J. E. Hooper, the secretary, have joined the board.

EXPANDED METAL COMPANY, LIMITED—Cmndr. Sir John Maitland has joined the board. He was previously an alternate director.

AMALGAMATED COLLIERIES OF SOUTH AFRICA, LIMITED—Mr. B. W. Pain has joined the board in succession to Mr. H. C. Koch, who has resigned.

SIDNEY FLAVEL & COMPANY, LIMITED—Mr. C. A. Lewis has joined the boards of the two subsidiary companies. General Stampers, Limited, and Turley & Williams, Limited.

IMPERIAL CHEMICAL INDUSTRIES, LIMITED—Viscount Amory of Tiverton, former Chancellor of the Exchequer, has been appointed to the board as a non-executive director.

GLENFIELD & KENNEDY HOLDINGS, LIMITED—Sir James R. H. Hutchison has been appointed a director and chairman in succession to the late Mr. Hugh Cowan-Douglas. Mr. J. Douglas Latta has also joined the board.

PARKER, WINDER & ACHURCH, LIMITED—Mr. G. Phillip Achurch is to resign as chairman at the end of the year, although he will retain his seat on the board. In due course it is proposed to appoint Mr. A. J. Billingham, the present managing director, as chairman.

LANCASHIRE DYNAMO & CRYPTO, LIMITED—Mr. J. B. Spence has joined the board of the company, one of the Metal Industries, Limited, group, and will be general manager of the Willesden works in succession to the late Mr. C. F. Jackson. Mr. D. W. Malim is director and general manager of the Trafford Park works.

ASSOCIATED ELECTRICAL INDUSTRIES, (MANCHESTER), LIMITED—Mr. A. Cooper has been appointed comptroller in sucession to Mr. E. Tankard who has retired. Mr. Cooper will also succeed Mr. Tankard as a member of the AEI accounts committee, as a director of AEI Finance Company, Limited, and as a director of New Era Electrical Manufacturers, Limited.

CROFTS (ENGINEERS), LIMITED—Mr. E. J. Holdin, formerly general sales manager, has been appointed home sales director; Mr. F. Rotheray, formerly oversea sales manager, is now oversea sales director; Mr. H. W. Cameron, formerly London area manager, is now London area director, and Mr. A. Spencer, formerly commercial manager, is now commercial director.

SMALL & PARKES, LIMITED—Mr. R. H. Dent has joined the board and been appointed chairman. Mr. T. C. Hale has been appointed a director. They are the joint managing directors of the parent company, the Cape Asbestos Company, Limited. Mr. G. W. Parkes, who has been a director of the company for 40 years and chairman for 11, is to continue as joint managing director until April, 1961, when he is to retire from the board.

HAWKER SIDDELEY BRUSH (SOUTHERN AFRICA), LIMITED—Mr. Jack Davison, at present managing director of Hawker de Havilland (Pty.), Limited, has been appointed managing director of the company and of Switchgear & Erection Company (Pty.), Limited, and chairman of Hawker Siddeley Brush (Central Africa) (Pty.), Limited, as from April 1, 1961. He succeeds Mr. Frank A. Vaughan who is returning to the head office of the Hawker Siddeley Group in London.

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# *"Transformer Price Cuts if Pact is Scrapped"*

WARNING that price-cutting would begin if the restrictions in the price-fixing agreement among members of the Transformer Manufacturers' Association were abrogated, was given by Mr. R. M. Charley, a consultant with the English Electric Company, Limited, in the Restrictive Practices Court last Friday. The court, which is considering if the agreement is in the public interest, was told by Mr. Charley that prices would drop "to an alarming degree" until they steadied off near rock bottom.

Mr. Charley thought that this would mean that some manufacturers might have to stop making transformers, as happened from 1927 to 1932, and that some firms would be on the verge of bankruptcy. If designers were pressed by managements to produce cheaper transformers against their better judgment, he added, they would have to take chances that might perhaps reduce the reliability of the equipment.

He agreed with Mr. J. Megaw, QC, for the Registrar of Restrictive Trading Agreements, that if some manufacturers stopped production the disappearance of that capacity would make the remaining capacity accord more closely to the demand.

Mr. Charley also agreed that non-member manufacturers were tending to capture the transformer export markets, although not so much in the case of very big transformers.

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## Japanese Help for Pakistan Steelworks

IT has been officially announced in Karachi that the Pakistani authorities have asked Japan for help in the erection of a plant for the production of 100,000 metric tons of ingot steel annually. The projected plant would be built in Chittagong at a cost of $20,000,000 and be equipped with rolling plant.

The Japanese Government has passed on the request to the country's steel industry, which is said to be studying it in detail.

# IRON AND STEEL TRADE

## Changes in Official Price Schedules

WHILE, overall, the changes announced last week to operate from Monday (November 28) do not represent any increase in the general level of iron and steel prices, they bring an advance of 11s. in the price of common foundry iron which is not calculated to please the iron-founders. Steel users benefit more than they suffer from the changes, for there are some useful reductions in the prices of a number of products.

Steel forgers pay 10s. a ton less for forging billets as from last Monday. There is no change in soft basic re-rolling billets, but free cutting billets are 10s. cheaper. Users of acid and bright drawing billets have to pay more. Fabricators of stainless steel bars and sheets have the cost of their raw materials reduced, and others to benefit are users of EN10 alloy bars and buyers of cold-rolled strip. Some tubes are dearer, and so are non-alloy bright bars.

A number of "presentational" changes have been made in the official price schedules. Among them is a more consistent use of the term "basis price." In the past the description "basis price" has not for all products been applied to the price for the largest quantity. In future, the price for the largest quantities of all heavy steel and re-rolled products will be called the "basis price." It will be equivalent to the former basis price less former allowances for quantity where these were applicable. In consequence the price schedules for heavy steel and re-rolled products will not in future contain provision for allowances for quantity, but there will be extras for smaller quantities. The purpose is to achieve more uniformity in the price structure. The changes are incorporated in the list of prices which appears on page 1248.

### Pig-iron

Requirements of the engineering foundries for pig-iron are easily met by producers and low phosphorus, hematite, and refined irons are plentiful. The jobbing and textile foundries are able to obtain reasonably good outputs, but the supply of high phosphorus pig-iron is more than adequate to satisfy their needs.

Tonnage of high-phosphorus iron available for export is considerable, the only difficulty being in getting enough orders to justify the trade.

### Ferro-alloys

The slight increase in ferro-tungsten activity is barely maintained, but there is a fair demand for ferro-vanadium and ferro-molybdenum. Both the 45 per cent. Si and 75 per cent. Si grades of ferro-silicon are receiving some attention, and ferro-chrome continues active.

Ferro-niobium is active, and there is a fair request for ferro-titanium.

### Semi-finished Steel

A good demand persists for the products of the re-rollers, particularly for reinforcing bars. Probably because of the recession in the motor car industry, some slackening is reported in the call for light sections, hot rolled strip, and bright drawn bars.

Most of the re-rollers have fairly good stocks of mild steel semis, home steelworks continuing to send forward substantial supplies.

### Finished Steel

The demand continues on a very active basis for sections and joists and the pressure by consumers is such that the more popular sizes have practically disappeared from the existing rolling programmes. Several makers are fully booked for the first quarter of 1961, but tonnage can still be placed for special sizes for fairly early rolling.

The decline in the call for cold reduced sheets has become more marked with the persistence of the motor industry recession and makers of corrugated and flat galvanized sheets could do with further tonnage for inclusion in current programmes.

## *Start Made on £26,000,000 Steelworks' Extension*

WORK started on Monday on the £26,000,000 scheme for the further development of the 500-acre site at Tinsley Park, Sheffield, of the English Steel Corporation, Limited, which will provide 100-ton electric melting furnaces and blooming billet and bar mills by 1963. The initial job of earthmoving is expected to be completed in about five months. About 3,000,000 cu. yd. have to be moved and consolidated into terraces on which the steelworks will be erected. The contractors will also demolish the present buildings, including colliery offices, and prepare the ground for the laying of railway tracks.

An aerial survey of the site revealed a difference in levels across the site of more than 100 ft., and one of the problems which has faced the consulting engineers has been that of minimizing the earthworks and, at the same time, maintaining a gradient better than 1 in 90 for the rail tracks, which will therefore have to loop round about three-quarters of the site.

AUSTRIAN INDUSTRIAL CONCERN, Alpine Montangesellschaft, has opened a fully-automatic coal-unloading plant at the Graz-Köflach railway station in the Austrian city of Graz. The plant, for which only one man is needed as operator, can unload up to 1,000 metric tons a day. Unloading a 20-ton railway wagon, which previously took four hours, now lasts only five minutes. The unit incorporates wagon tipper and conveyor belt system.

*Orders Placed*

# £750,000 Order for Steel, Peech & Tozer

IN the face of world-wide competition, Steel, Peech & Tozer, branch of the United Steel Companies, Limited, has secured contracts worth £750,000 for the supply of railway axles and wheels to Mexico.

Deliveries will be spread over about 10 months and will provide work for certain departments which have been short of orders in recent months, including the wheel mill and axle forge at Steel, Peech & Tozer and the machine shops at Owen & Dyson, Limited. A similar order was placed with the company about 12 months ago.

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WORK in connection with the rebuilding of flour milling plant at the Port Colborne, Ontario, mills of Leaf Milling Company, Limited, is to be carried out by Henry Simon, Limited, Stockport (Ches).

FIRST CONTRACT to be announced for nearly a year by Swan, Hunter, & Wigham Richardson, Limited, shipbuilders, of Wallsend, is worth £2,000,000. The company is to build two cargo motor ships.

ABBOTT LABORATORIES, LIMITED, has awarded a contract to Chemical Construction (G.B.), Limited, to furnish certain design, procurement, and erection services, in connection with the transfer and expansion of the Abbott chemical production facilities.

ORDER FOR MINE DRIVAGES at the new colliery being constructed by the North-Western Divisional Coal Board at Parkside, Newton-le-Willows (Lancs), has been awarded to George Wimpey & Company, Limited. The work involves 10 miles of tunnelling, includes 40 junctions, and forms part of a £2,000,000 scheme for underground development. Work on the contract is to start next March.

SUPPLY AND ERECTION of a set of mild steel purifier boxes with a capacity of 10,000,000 cu. ft. of gas a day for the West Melbourne Gasworks is to be undertaken by Whessoe, Limited, Darlington. The contract is worth £A200,000 and engineering design and drawing will be carried out at Darlington, while the contract as a whole is being organized in conjunction with Norman J. Hurll & Company (Victoria) Pty., Limited, Melbourne.

COMPLETE coke-oven installation for the Cargo Fleet works, Middlesbrough, of the South Durham Steel & Iron Company, Limited, is to be supplied and erected by Gibbons Bros., Limited, Dudley. The contract is worth about £2,700,000. The new installation will consist of 60 ovens, coal and coke handling plant, and by-products plant. It is scheduled for completion at the end of 1962 and will replace 90 ovens at present in use at the works.

CONTRACTS WORTH OVER £200,000 have been secured by Associated Electrical Industries, Limited, for squirrel-cage motors. One order, worth £120,000 is for motors to drive compressors in a new oxygen tonnage plant in New South Wales, which will produce oxygen for steel manufacture. Other orders were placed by the Kuwait Oil Company, Limited, Harland & Wolff, Limited, the Fluor Engineering Construction Company, Limited, and the Mechanical Construction Company, Limited.

COMPLETE sulphuric acid plant at Kafr El Zayat, with a capacity of 150 tons of acid a day from elemental sulphur, has been ordered from Simon-Carves, Limited, by Société Financière et Industrielle d'Egypte. As well as steam-raising equipment, the plant will incorporate a power-producing unit capable of developing an excess of electricity for feeding back into the factory mains. The company is also to build a contact sulphuric acid plant for Eerste Nederlandsche Co-operative Kunstmestfabriek at Vlaardingen, Holland.

TWO ORDERS, valued at a total of £330,000, have been received by the General Electric Company, Limited, from Albert E. Reed & Company, Limited. They cover two turbo-generators, a 10 mW. passout condensing set and a 7 mW. back-pressure set, both for installation at Aylesford paper mills, Kent. An 11,000-sq. ft. surface condenser, to be made by Hick, Hargreaves & Company, Limited, has a condensing capacity sufficient to cater for full load if no passout steam is required. A pressure- and temperature-reducing station by-passing the back-pressure set is included in the contract and will be supplied by Electroflo Meters, Limited.

WINDING ENGINE valued at nearly £70,000 has recently been ordered from the British General Electric Company (Pty), Limited, of South Africa. The winder will be of the double-drum double-clutch type, having cast steel drums 10 ft. in diameter by 4 ft. wide, driven through single-reduction double-helical gears by a single a.c. induction motor. Provision is made for the fitting at a later date of a spragging arrangement which will provide a positive lock entirely independent of friction to hold the unclutched drum. The mechanical equipment for the winder will be designed by GEC's Erith works and manufactured in South Africa by the East Rand Engineering Company, Limited. Design and manufacture of the winder electrical equipment will be carried out at GEC's Witton works.

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# Coal Will Soon Pay its Way—Mr. A. Robens

FORECAST that the coal industry would be paying its way "within the next year or two" was made by Mr. Alfred Robens, chairman-designate of the National Coal Board, at Birmingham on Tuesday. He said he based his forecast on the assets the industry had built up through capital investment and the progress being made in productivity. The coal industry's production rate was probably higher than any other industry and this was making a vast difference to costs.

On a private visit to the West Midlands Division of the NCB, Mr. Robens at a press conference, said: "The investment programme over the past 10 years has been heavy. We are at the beginning of reaping the harvest from the work done in those years. I look forward with tremendous confidence to the next three or four years."

Mr. Robens reiterated that in his view the right size for the industry was based on an annual output of 200,000,000 tons of coal, fluctuating, perhaps, 5 per cent. according to the weather. He believed that was the right size because if it was made any smaller all the benefits for the investments of the last 10 years would not be received. This would lead to selling coal in competition with oil and other fuels and would need a big sales effort.

Mr. H. A. Longden, chairman of the West Midlands Divisional Coal Board, said there should be no shortage of house coal this winter, though stocks of large coal were lower than a year ago. Transport remained the main problem.

## *Company News*

# BSA's £8,500,000 BID

## For Churchill Machine Tool Company

BID for the capital of the Churchill Machine Tool Company, Limited, precision grinding machine manufacturers, of Altrincham (Ches), has been made by Birmingham Small Arms Company, Limited, the engineering and machine-tool group. The directors of Churchill announced last week that an offer had been received from BSA of 40s. cash for each 5s. ordinary stock unit and of £11 BSA 6 per cent. cumulative " B " preference stock for every £10 Churchill 6 per cent. cumulative preference stock.

The offer valued the £1,055,040 ordinary stock of Churchill at £8,440,000 and the £114,400 6 per cent. preference at £110,000 on the basis of the then current Stock Exchange price of 17s. 6d. for the BSA preference. The offer was made in a letter to the Churchill Machine Tool board dated November 23, and it is stated to be subject to the " usual conditions." The Churchill directors point out that the offer has not been invited by them, but that they will consider its terms and express their views to stockholders as soon as possible.

Churchill Machine Tool, which makes medium and light precision grinding machines, earned £307,000 after tax on the whole of its share capital for 1958-59, so that the £8,500,000 offer values the earnings on a 6 per cent., less tax, basis. The company's best year was in 1953-54 when it earned £378,000 net for dividends.

## Senior Economisers Acquires Phoenix Steel Tube

FURTHER details of the acquisition of the Phoenix Steel Tube Company, Limited, by Senior Economisers, Limited, have been announced. The aggregate purchase price for the whole of the issued and fully-paid share capital of Phoenix, £525,000 cash, has been met out of resources.

Phoenix, a private company incorporated in 1930, manufactures and markets seamless steel tubes in hot rolled and cold drawn qualities, also electric resistance welded steel tubes to a variety of steel specifications. Manipulated and fabricated tubes are also supplied to customers' requirements.

Mr. J. L. Maddocks, managing director, and son of the chairman and founder of Phoenix, the late Mr. L. T. Maddocks, has joined the board of Senior Economisers. The late Mr. Maddocks is succeeded as chairman of Phoenix by Mr. D. D. E. Vivian, chairman of Senior Economisers, and his fellow directors, Mr. H. P. Jones and Mr. G. R. Deveson, also join the Phoenix board. Mr. W. G. Sheasby, sales director, and Mr. E. F. T. Allsop, secretary and director, become full-time directors of Phoenix.

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FRANCIS MORTON & COMPANY, LIMITED—The joint liquidators of the company, which is in voluntary liquidation, announce that the books will be closed on December 9 and will not be reopened. A circular regarding a second distribution is to be forwarded to holders in about two weeks time.

FAIRFIELD SHIPBUILDING & ENGINEERING COMPANY, LIMITED—Group net profit for the year ended June 30, 1960, rose from £388,903 to £413,692, after tax of £446,000 (£430,000).

BUTTERLEY COMPANY, LIMITED—Capital profits distribution of 4d. per 2s. 6d. share, not subject to tax, is payable December 10. The last two payments totalled 9d. per share.

SEDDON DIESEL VEHICLES, LIMITED—Profit, before tax, for the year ended June 30, 1960, was £100,115 (£54,989) and a final dividend of 10 per cent. makes 15 (5) per cent. for the year.

DELTA METAL COMPANY, LIMITED—The offer for the ordinary shares of Sperryn & Company, Limited, has been accepted by holders of over 90 per cent. of the shares and has been made unconditional.

NOTTINGHAM PATENT BRICK COMPANY, LIMITED—Net profit for the year ended September 30, 1960, was £24,324 (£17,430), after tax of £21,277 (£18,071). Final dividend of 30 per cent. makes 40 (37½) per cent.

SIMON-CARVES, LIMITED—The company has bought 75 per cent. of the issued capital of S. L. Robinson, Limited, earth moving contractors, for £67,500 and also 60 per cent. of the issued share capital of Newsham Engineering Industries, Limited, for £115,000.

FOLLSAIN, LIMITED—All the issued share capital of J. R. Campbell (Engineers), Limited, gear-cutting specialists, of Slough, Bucks, has been acquired. The company will be operated in conjunction with the Follsain subsidiary, Varatio-Strateline Gears, Limited.

HUGH SMITH & COMPANY (POSSIL), LIMITED, hydraulic engineers and heavy machine-tool makers—The company has changed its name to Hugh Smith (Glasgow), Limited. There is no change in the constitution or control of the company, and the directorate remains unaltered.

LEEDS FIRECLAY COMPANY, LIMITED—No dividends are being paid on the preferred ordinary or ordinary shares for the year ended June 30, 1960. A net loss of £49,926 (£13,134) was incurred during the year, but Lt.-Col. R. B. Leech, the chairman, says that the outlook is improving.

AURORA GEAR & ENGINEERING COMPANY, LIMITED—Terms have been agreed for the acquisition on or before December 31, 1960, of Fit, Limited, and its wholly-owned subsidiary, Fit (Barnet), Limited, manufacturers of tyre remoulding equipment, etc., for £58,000 cash, 30,000 7 per cent. £1 preference, and

90,000 ordinary 1s. shares. A one-for-two rights issue at 2s. 6d. a share is to be made to provide the cash for the deal and to provide additional permanent capital. It is proposed to create 5,000,000 additional 1s. ordinary shares to enable the directors to negotiate freely the acquisition of other businesses.

CONCENTRIC MANUFACTURING COMPANY, LIMITED—A one-for-five rights issue is proposed to finance capital expenditure on buildings and plant and to repay existing bank overdrafts. Group net profit for the year ended October 1, 1960 was £253,991 (£215,138) and the dividend is increased from 35 per cent. to 40 per cent.

BROKEN HILL PROPRIETARY COMPANY, LIMITED—Net profit for the year ended May 31, 1960, was £13,592,287 (£9,952,981) and the dividend is 8¼ (8¼) per cent. on an increased capital. A one-for-two scrip issue is to be made this year and a revaluation of fixed assets is to be undertaken. A new cash issue in 1961 is also contemplated.

BIRFIELD, LIMITED—Group net profit in the year ended July 31, 1960, rose from £367,475 to £1,167,560, after tax of £1.431.563 (£592,322). Sales for the year totalled £26,290,000, compared with £20,640,000. A one-for-five scrip issue is proposed and the directors hope to maintain the 10 per cent. dividend on the increased capital for 1960-61.

ANDERSON BOYES & COMPANY, LIMITED, makers of coal-cutting machinery, power loaders, mining type switchgear, etc., of Motherwell—Offer for the sale of 910,000 ordinary £1 shares at 29s. was between four and five times oversubscribed. No basis of allotment and no indication as to exactly how many shares were applied for have been given.

AMBROSE SHARDLOW & COMPANY, LIMITED, forgers and stampers, of Sheffield—Net profits, after tax, for the half-year ended September 30, 1960, were £222,000 compared with £259,000 for the previous six months and £157,000 for the corresponding period of 1959. The interim dividend is increased to 4 per cent. from the equivalent of 3½ per cent.

WRIGHTS' ROPES, LIMITED—Decline in group profits from £276,877 to £155,075 for the year ended September 30, 1960, is largely accountable to the Canadian subsidiary, Okanagan Equipment, Limited, which incurred a loss. An unchanged final dividend of 10 per cent. maintains 15 per cent. Net profit was £74,021 (£151,402), after tax of £81.054 (£134,975).

JAMES H. DENNIS & COMPANY, LIMITED—Group net profit of £45,583 for the year to July 31, 1960, compares with a loss of £103,020 previously. Last year the company ceased manufacturing copper sulphate and copper production and has been dealing in metals. No dividend is to be paid on the privately-held 5½ per cent. cumulative preference shares, in arrears from 1957.

WOMBWELL FOUNDRY & ENGINEERING COMPANY, LIMITED—Very good prospects, having in mind the definite improvement in orders for constructional plating and steel work and for chilled and alloy rolls, were forecast by the chairman, Mr. Joseph Richards, at the annual meeting on Monday. The year had proved a record one as regards profit and turnover since 1954.

JOHNSON, MATTHEY & COMPANY, LIMITED—A controlling interest has been acquired in the Swedish precious metal company, A/B Gösta Nyström, of Stockholm. Mr. Gösta Nyström, who founded the business in 1917, has retired and a new board has been appointed consisting of four Swedish and two British directors, with Mr. Ove Trulsson as chairman. The company will in future be known as A/B Nyström & Matthey.

# *Concessionary Coal—National Agreement*

AGREEMENT has been reached between the National Coal Board and the National Union of Mineworkers under which miners who live in smokeless zones will be paid £42 7s. a year in lieu of concessionary coal. The sum is the national average value of concessionary coal. Announcing the agreement, Mr. F. Collindridge, secretary of the Yorkshire Area of the NUM, said that the money would not buy the equivalent in smokeless fuels of the present coal allocation, but the miners hoped to retain the right to negotiate for supplies of alternative fuel instead of payment.

A letter of apology has been offered by Mr. D. McTighe, manager of Denaby Main Colliery (Yorks), over an incident which led to a strike at the pit. Mr. Collindridge said that the Yorkshire Miners' Council had agreed that the letter should be posted at the colliery.

# No Decline for South Wales Coal Industry

THERE will be no problem in future in finding outlets for coal; the problem is more likely to be one of meeting requirements, said Mr. R. C. Lewis, manpower officer of No. 6 (Monmouthshire) Area, South-Western Divisional Coal Board, last week. He was speaking at Newport Rotary Club luncheon.

On top of the current demand for coal it was expected that Monmouthshire would be faced with demands for a further 1,500,000 tons of coking coal a year when the Spencer steelworks of Richard Thomas & Baldwins, Limited, came into operation, he said.

Mr. Lewis emphasized that the industry was by no means in decline in South Wales in general or in Monmouthshire in particular. The county produced some of the finest coal in the world for making steel and there was now virtually no coal stocked on the ground.

# 1,000,000 Tons of Coal Mined at Gedling

GEDLING COLLIERY (Notts) last week became the first pit this year in the East Midlands Division of the National Coal Board to achieve an output of 1,000,000 tons. Output at the face in the colliery has averaged nearly 5¼ tons per manshift—about half a ton more than in 1959 and 2¼ tons more than in 1947. Overall OMS this year rose to a new record of 42.6 cwt. —12 cwt. more than in the first year of nationalization.

Gedling is the biggest pit in the Division and the biggest house coal producer in Britain. Between 1950 and 1957 a £2,000,000 reconstruction scheme was carried out there and at the present rate of output the colliery has enough reserves to take it well into the next century.

NEW £1,000,000 plant is to be built by the Metal Box Company, Limited, at Scunthorpe (Lincs), early next year. It will manufacture cardboard and paper cartons.

MR. A. H. KELLETT

## MR. A. H. KELLETT

DEPUTY CHAIRMAN of the Durham Division, National Coal Board, since September, 1959, Mr. A. H. Kellett, who is 56, was educated at the Bow School, Durham, and Rossall School. At Cambridge University, he took an Honours Degree in Mechanical Sciences and, subsequently, while a mining student with Dorman, Long & Company, Limited, he spent two years at Birmingham University, where he took a B.Sc. Honours Degree in Mining. He spent some time between 1925 and 1927 visiting other coalfields in Great Britain, Germany, and the United States.

Before joining the National Coal Board in 1947, Mr. Kellett was managing director of the Washington Coal Company, and associated companies. From March, 1947, to May, 1950, he was deputy general manager of the No. 1 Area of the NCB's Northern Division. When the division was reorganized that year he was appointed to the new post of Area production manager of the newly created No. 1 Area of the Durham Division, being appointed general manager of the division's No. 2 Area in October of that year.

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*The Peake Travelling Scholarship of the Midland Institute of Mining Engineers was awarded to Mr. Brocklesby to enable him to study the methods of organization and management adopted by successful coal-mining companies in the United States, to see how far their methods might be applicable to mining in Britain. A paper based on his study was presented by the author to the Midland Institute on November 3, and is here given in abridged form. The full text of the paper will be published in the Transactions of the Institution of Mining Engineers. Mr. Brocklesby is now technical manager for Richard Sutcliffe, Limited, in the West Midlands Division of the National Coal Board.*

# *Management and Maintenance in US Collieries*

## *British and American Organization Compared*

By M. BROCKLESBY, M.A., B.Eng.(Min.)

THE bituminous coal industry in the United States of America is in vicious competition with oil and natural gas. The United Mine Workers of America has forced up the rate of wages in recent years and the operating companies have been faced with the choice of increasing their productivity or going out of business. Those which have survived and are mining coal at a profit are the companies that are organized to make the fullest use of the capacity of their machinery.

Geological conditions are good: the seams are flat and generally thicker than those being worked in Britain, faulting is rare, and the depth of cover is less. The application of mining methods developed for these conditions is, in general, not possible in Great Britain. The attitude of the union towards mechanization has been very helpful. Mr. John L. Lewis, past president of the United Mine Workers of America, has long realized that an increase in wages can only be met by an increase in productivity, and has accepted the fact that this will result in a reduced labour force. Open-cast mining, which in 1957 accounted for 25.2 per cent. of the production, has contributed to high productivity.

### A Typical Mine

Nineteen American mines that were visited by the author were working seams from 32 in. to 8 ft. thick, and had overall productivities ranging from 9 to 25 tons per man-day. The example is taken of a mine working a thick seam, such as the Pittsburgh No. 8, which is mined in Pennsylvania and northern West Virginia. In thinner coal the general picture would be the same, but the productivity of the working sections would probably be lower.

The average daily output of the mine is 5,200 tons, which is produced from six working sections, two using conventional trackless equipment and four using continuous miners. Some 300 men are employed at the mine, giving an overall productivity of 17.3 tons per man-day and a section productivity of 50 tons per man-day, excluding officials and maintenance men. The output of the mine is conveyed to the surface up a drift, which is also used for materials haulage. Men ride in a shaft equipped with a push-button elevator.

The coal seam is 7 ft. thick, of which 6 ft. is mined, leaving 1 ft. of coal roof. The strata immediately above the coal consist of a medium strength shale; further above, there are frequent beds of sandstone which are strong enough to span the headings and form good anchoring horizons for roof bolts. The floor is a medium hard fireclay. The strata have an average dip of 1 in 50, although there are local gradients of up to 1 in 20. There is no faulting, but the seam is washed-out in some areas. The depth of cover ranges from 100 to 200 yd.

The method of work adopted is room and pillar. Main development panels of seven headings at 80-ft. centres are driven from the pit bottom, from which similar secondary developments are driven

at right-angles, out to a predetermined boundary dividing the area to be worked into blocks about 800 yd. wide which are then worked out in retreat. This is done by driving production panels of five headings at right-angles to the secondary developments; when these reach the adjacent headings the pillars are mined out in retreat. As the panels are brought back, further headings are driven to widen them out to include eight pillars.

### Staff and Manpower

The staff and manpower of the mine are as follow:—

STAFF.—Superintendent, 1; general mine foreman, 1; shift foremen, 3; section foremen, 13; construction foreman, 1; mining engineer, 1; assistant mining engineer, 1; junior engineers, 3; maintenance engineer, 1; maintenance foremen, 3; surface repair shop foreman, 1; surface foreman, 1; preparation plant foreman, 2; mine accountant, 1; mine clerks, 4; total staff, 37.

MANPOWER.—Section labour, 104; dispatchers, 3; locomotive crews, 12; general underground, 58; maintenance men on sections, 24; maintenance men in underground shops, 10; maintenance men in surface shops, 6; general surface, 18; preparation plant, 28; total labour, 263.

It was the author's experience, while living in the United States for one year, that a dollar was worth roughly 5s. On this basis, the mine superintendent is paid the sterling equivalent of £300 per month, the general mine foreman £250, shift foreman £212, section foreman £188, mining engineer £212, maintenance engineer £248, maintenance foreman £188, machine operator £132, shuttle car driver £121, general underground labour £119, and maintenance men on the sections £140. The four last-named are paid at daily rates.

Two of the sections of the mine are worked by what is termed conventional trackless equipment. On these sections each working place is bored and under-cut to a depth of 9 ft. by a universal coal-cutter mounted on rubber tyres. The holes are bored by a portable hydraulic drill operated from the hydraulic system of the cutter. The coal is fired by explosives and filled out by a gathering-arm loader delivering alternately into two shuttle cars which dump on to a gate conveyor. The roof is then supported by wooden bars and roof bolts, using a roof-bolting machine also mounted on rubber tyres.

The crew of a conventional section numbers 10, and on development work will usually cut and load from 15 to 18 places a shift, producing about 500 tons. When the pillars are being extracted only about 400 tons would be expected.

### Continuous Miners

The other four sections of the mine are worked by continuous miners. On these sections each of the headings and cross-cuts is driven in turn by the miner, which mines its way forward, dumping the coal on the ground behind it. It is followed by a gathering-arm loader which picks up the dumped coal, delivering it into the shuttle cars. This system is adopted to make fuller use of the capacity of the miner, which would otherwise have to stop production when the shuttle cars were being changed.

Even with this system, however, it is rare to find a miner actually producing for more than 30 per cent. of the shift.

The crew of a continuous miner section numbers eight, and on development work would produce about 400 tons per shift; when the pillars are being mined out in retreat an output of about 500 tons per shift would usually be produced.

### Haulage

The shuttle cars dump into the tail-end hopper of a conveyor, which runs in the centre-gate of the panel and delivers into 15-ton mine cars at a loading station at the end of the panel. There is no attendant at the loading station, which is fully automatic. The trolley-wire locomotive crews shunt the empties on to the section, couple them to the train already under the loader, and then drop back and uncouple a run of loaded cars and haul it to the pit bottom. In the pit bottom, the cars, which have swivel couplings, are controlled through the tippler by hydraulic pushers and gravitate into the empty shunt; the runs are never uncoupled. From the tippler the coal is carried up a 400-yd. drift on a 42-in. conveyor which delivers directly into the preparation plant bunkers.

Man-riding is by means of section cars. These are self-propelled vehicles which take their power from the trolley-wire system and can seat the whole section crew. At the beginning of the shift each crew, together with the section foreman and the maintenance man, get into their respective section cars and drive on to the section. They return in the same way at the end of the shift.

There are also four small trolley-wire vehicles, called "jeeps," which are used by the superintendent, general mine foremen, and maintenance staff for travelling in the mine. These jeeps play a very important part in enabling senior management officials to keep in close personal touch with the operations and in getting maintenance men and spare parts on to the section in the case of breakdown.

Materials are taken inbye to the loading points with the empties. Track is usually laid in the production panels, and the trolley-wire system extended, so that the materials cars can be hauled directly up to the producing section. As more conveyors are being installed, however, there is a tendency to make use of rubber-tyred vehicles for materials handling. In some cases, the materials are off-loaded at the end of the panel and taken on to the section in battery-powered shuttle cars. At mines where trunk conveying is practised, materials may be hauled from the shaft-side on rubber-tyred trailers pulled by battery-powered tractors.

The general structure of line management at British and American mines is similar. The super-

intendent, corresponding to the manager, is responsible for the overall operation of the mine. Directly below him is the general mine foreman, who is in charge of underground operations and to whom shift foremen on the afternoon and night shifts report. The section foreman, corresponding to the deputies in Britain, are in charge of the working sections. There is usually no equivalent position to that of the overman.

The maintenance engineer, sometimes termed the chief electrician, is responsible for both electrical and mechanical matters at the mine. He is almost entirely concerned with the underground equipment and has usually little to do with the surface plant, which is the responsibility of the surface foreman and preparation plant foreman.

There is usually a mining engineering staff based at the mine.

### Industry's Wage Structure

The wage structure of the industry has a considerable bearing on the job of management. All men working on power-loaded sections in the United States are paid a flat day-wage, with no bonus. Although there are certain differences in rates in various parts of the country, almost all are based on negotiations carried out at national level.

One interesting and important feature of the contract is a levy of 40 cents per ton which the union receives on all bituminous coal produced at union mines. The proceeds go into the United Mine Workers of America Welfare and Retirement Fund.

The implications of the day-wage were discussed with managements at the companies visited, who felt that it was the only satisfactory system of payment for mechanized mining. Whenever management makes use of piece-rates, it delegates some of the responsibility for production to labour, and the men will assume they have a right to have some say in changes which might affect their earnings. As a result, every change or modification to the method of work may well be accompanied by tedious mine level negotiations, usually resulting in compromise. If mechanization is to succeed the companies believe that management must have the complete responsibility for deciding how the machines are to be used or modified. Therefore, although it is admitted that for a given set of conditions it is possible that a greater output might be obtained if men were paid by results, this is more than counterbalanced by the ease with which improved methods can be implemented.

It is further suggested that this wage structure has had a marked effect on the attitude of the union. Firstly, the fact that the local union cannot affect the wages of its members tends to breed a less aggressive union man at the mine. Secondly, it increases the authority and power of the union leaders at national level, who have a greater sense of responsibility, and will take swift and strong remedial action if any local union breaks the terms of the contract.

With this wage structure, the productivity of a section depends very largely on the section foreman and on how much work he can get out of his crew. His job is not easy, as he has few sanctions to back his authority; it is, for instance, very difficult to dismiss a man for unsatisfactory work. He has to rely mainly on building up a team spirit in his group. Much has been said about the way in which the American section crews work together as a team, and, indeed, when they are seen in action this is one of the most striking features. This, however, is not something which occurs automatically, but is the result of on-the-job leadership by the section foreman.

The section foreman is in a better position to give this leadership than is the deputy. In particular, he is dealing with far fewer men. There are usually not more than 10 men in his team, often only seven, and they are working in a relatively small area which can easily be travelled. This is especially so in the continuous-miner sections, where the whole output is coming from a single working place. It is suggested that this closeness of the supervision on the working sections is one of the main factors responsible for the efficient performance of the crews.

The section foreman is paid a good salary, but he is expected to deliver the goods, and is under considerable pressure. Some companies make use of bonus schemes; others rely on frequent personal contact with senior management and the encouragement of competition between sections.

The section foreman will usually report verbally to the general mine foreman at the end of the shift and confer with the oncoming foreman. He also fills in a production report form. Apart from production information, a report on the condition of the machinery is also required.

### Mining Engineers

At most mines there is a resident mining engineer; working under him there is usually an assistant engineer, with two or three junior engineers and sometimes one or two draughtsmen. He is responsible for surveying, making mine plans, planning the future development of the mine, and preparing any periodic forecasts and reports which may be required. At mines which use standard costing, the performance standards are usually set by the mining engineers, in most cases based on time studies. The engineers would also make regular visits to the sections to review the standards.

When a new type of equipment is to be installed the resident mining engineer would work out details for its use below ground, such as the expected performance, sequence of operations on the section, support plans, staffing, and ventilation requirements. He would also review existing methods of work and suggest improvements.

The mining engineers provide a very useful service to the superintendent in supplying him with detailed information about any part of the mine which is not operating according to plan. If, for example, one of the sections is not producing satisfactory results, the first move would usually be for the resident mining engineer or some of his

staff to go on to the section and make detailed time studies to find out where the delays are occurring and make recommendations.

It will be seen then, that although the superintendent has the final responsibility of running the mine, he has the resident mining engineer and his staff, who take much of the technical work off his shoulders.

### Maintenance

A study of the maintenance procedures in operation at the companies visited was made in order to examine the approach to this problem that had evolved at mines which had been highly mechanized for a long time.

Detailed schemes for planned maintenance were rare. The emphasis was on regular lubrication and the replacement of defective sub-assemblies as units. Very little fitting work was done on the producing section. Although equipment was operated on three shifts at some mines, it was general practice to work only two shifts and reserve the third shift for maintenance. Increasing attention, however, was being paid to maintenance, largely as a result of the growing use of continuous miners.

There is regular lubrication and examination of the equipment so that repairs and replacements can be planned and carried out on a non-producing shift. Some of this work is carried out by the maintenance men in the production team during snap time; more detailed examinations are carried out on non-producing shifts. The mechanical inspections are external; visual examination, checking for play, listening and testing the operations. It is rare for the machines to be opened up on the working sections.

Most of the machines used below ground are large and not easily taken out of the mine or off the section. They are, therefore, usually constructed so that sub-assemblies or units such as gearboxes, motor-gearbox units, cutting-heads, or wheel units can be easily removed and replaced. In the event of a part failure, the entire sub-assembly is replaced and the defective one repaired in one of the shops.

Schemes for the systematic replacement of units after a specified time or tonnage are not common. The argument put forward against them is that the rate of wear depends so much on the conditions under which the machine is working, and on who is operating it, that it is better to rely on the examination reports to decide when a unit needs replacing.

The engineering staff at American mines is not split into mechanics and electricians. The maintenance engineer and his staff, whatever their title might be, carry out all maintenance work, be it mechanical, electrical, or hydraulic. The maintenance engineer is responsible for the installation and maintenance of all equipment below ground. He usually has a maintenance foreman for each shift and a shop foreman if the mine has a large surface shop.

All the shaft mines visited had underground shops equipped with benches, small tools, and welding equipment in which much of the rebuilding of unit assemblies was done. Usually, whole machines could also be brought in, stripped down, and rebuilt, provided no machining work was needed. Replacements for the units most likely to fail were kept on hand in these shops, and could usually be got on to the working section within 30 min.

Some of the mines had well-equipped surface shops, but it was usual, where the geographical disposition of the mines permitted, for the emphasis to be heavily on central or divisional shops, which were equipped to do any work and machining necessary for the complete overhaul of the machines.

### Applications to Mining in Britain

The author suggests how some of the features of coal-mining practice in the United States described in the paper might profitably be applied to the National Coal Board.

One of the main reasons why the American mining industry operates so efficiently is that at each level in the organization the American mining engineer is faced with a smaller, less complex task than his British counterpart. This has been accentuated by the snowballing effect of high productivity, which, as it reduces the number of men that are being handled, makes it much easier to control operations and has remarkable consequential benefits in almost every other sphere. The basic reason, however, is that the industry is organized in much smaller units.

It is suggested that it would be of great advantage to reduce the size of the spheres of responsibility throughout the National Coal Board. It is also suggested that in the NCB the Area should be the highest level at which technical control be exerted, division maintaining only financial control over the Areas, and setting production quotas. Further, the Area itself would seem to be too large a unit for effective operational control, and could well be reduced in size by half. It would not be an advantage to split Areas into sub-Areas, as this would create another level of command, of which there are already too many.

The role of the resident mining engineer in the United States has been described, and it is felt that such a staff could profitably be carried in the NCB organization. They would help line management officials by relieving them of much of their detailed technical work, supplying them with accurate, impartial information and enabling a closer control to be kept on the operation of the producing units.

### Salaries and Wages

Highly mechanized mining vastly increases the importance of the officials and the engineering staff at the mine. The salary and wages structure adopted by the NCB rates the faceworker as the most valuable man, the deputy second, and the mechanics and electricians a bad third. It is difficult to see how a concern which consistently under-

pays the men most vital to its success can hope to become a really progressive and efficient organization, the author states.

It is suggested that if the NCB is to get the men it needs in these posts, the deputy should receive a salary about 30 per cent. higher than the wage of the highest paid faceworker, and the Grade I mechanic or electrician should receive a wage equivalent to that of the faceworker.

If such a move were suddenly made it is appreciated that there would be no overnight change in the calibre of the men already in posts. Many would not justify such remuneration, and the immediate result would probably be an increase in absenteeism. Initially, it would be necessary to fix a range of remuneration between the existing and the suggested levels, the rate at which each man be paid being decided by management at the mine.

The flat day-wage with no bonus seems the most satisfactory form of payment for men on fully-mechanized faces, provided there is close supervision.

On semi-mechanized faces, where roof supports are advanced by hand and supervision is far from close, some form of contract or bonus payment may well be an advantage.

**Maintenance Approach**

The approach to maintenance in the United States is such that a minimum number of men is needed to keep the machinery running. The two key features are the replacement of unit assemblies and the provision of well-equipped underground shops.

In the design of equipment for use below ground in the British mines, particularly the more complex machines, more attention should be paid to the accessibility and ease of replacement of those components most likely to fail. As far as possible, they should be designed so that such components can be changed with the bare minimum of skilled work.

It is felt that it would be more profitable to stress such simple matters as oiling and greasing at Area level and below, than to attempt to enforce complex schemes for systematic examinations on an industry-wide scale.

Many advantages would result from the use of well-equipped underground shops, in which sub-assemblies and complete machines could be rebuilt. The fullest use could be made of the most skilled staff at the mine, who would normally be employed on rebuilding work. This would also ensure that there were craftsmen at the mine fully conversant with the equipment in use. A breakdown on the coal face which needs a skilled craftsman will usually involve spare parts as well, and the skilled men from the underground shop would be able to arrive on the job quite as quickly as the parts required.

There would also be a stock of rebuilt components at the most strategic place. This would mean an increase in the inventory value of spare parts carried by the board, but it is felt that this would be justified by the speed with which broken-down machines could be brought back into production.

The author firmly believes that the use of off-track equipment, not only in materials gates, but throughout the mine, would produce dramatic results in simplifying the operation of British mines and in increasing their productivity.

This type of secondary haulage is especially suited to the requirements of mechanized mining, which necessitates the periodic rapid handling of heavy pieces of equipment. In particular, the regular overhaul of complete power-loaders would be greatly facilitated.

The mobility of management below ground would be much increased, enabling a more direct control to be kept of the working faces and minimizing the need for paper work by facilitating personal contacts and verbal reporting.

One of the most noticeable features of American mines was the ease and speed with which men and materials can be transported below ground. The most striking example was seen at an all-belt mine in which there was no track, all secondary haulage being by means of rubber-tyred vehicles. The overall o.m.s. of this mine, 25 tons, was the highest of any mine visited.

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# *St. Helens Mining Society*

VOLUME 6 of the St. Helens Mining Society Magazine (4s.) contains all papers read to the society during the 1959-60 session. In his presidential address to the society, Mr. F. G. Glossop, production director, North-Western Divisional Coal Board, reviews some aspects of the problems facing the industry in the light of competition from oil. Now more than ever, he says, does the mining industry require the help of modern techniques, method study, and the utilization of every man's labour to the best advantage.

Winding tower construction at Parkside Colliery is described in a paper by Mr. A. Combrink, while the present and future trends in mechanization are discussed by Mr. T. Lester, mechanization engineer, No. 3 (St. Helens) Area, North-Western Divisional Coal Board. Stages in the progressing of a new colliery or other projects are outlined by Mr. D. J. Kay, of the planning department, No. 3 (St. Helens) Area, and developments in tunnelling in Lancashire over the past 10 years are reviewed by Mr. W. M. Linkletter, tunnelling and shaft sinking engineer, North-Western Division.

Past incidents in the north-west are described in a paper on "Mine Rescue Organization" by Mr. A. Cunliffe, superintendent of the North-Western Divisional Mines Rescue Station, Boothstown. The student's prize-winning paper, by Mr. J. F. Brass, outlines some recent experiments in strata control carried out at Bold Colliery.

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NORWAY'S TOTAL PRODUCTION capacity of ferro-silicon has now risen to 180,000 tons, compared with 40,000 tons before the war. Norwegian exports of ferro-silicon are expected to reach a new record total of 150,000 tons this year.

# *New Literature*

CATALOGUES, booklets, and other publications which have recently been received include those mentioned below. Readers wishing to obtain a copy of any of the publications referred to should apply direct to the address given, at the same time mentioning IRON AND COAL.

INCANDESCENT HEAT COMPANY, LIMITED, Cornwall Road, Smethwick, Birmingham 40—A single sheet leaflet (IN.2) gives details of "Incanite," the special process cast iron.

CROFTS (ENGINEERS), LIMITED, Thornbury, Bradford 3—Publication 6029 gives examples of the different jobs the company's patent "free-space" hydraulic couplings are doing.

GRIFFIN & GEORGE, LIMITED, Ealing Road, Alperton, Wembley (Middx).—A new catalogue (P.2121) containing current prices of volumetric and lampblown glass ware is now available.

MATBRO, LIMITED, Matbro Works, Horley (Surrey)—A trilingual brochure in English, French, and Spanish has been prepared to introduce a new range of Matbro fork lifts to oversea markets.

THOS. W. WARD, LIMITED, Albion Works, Sheffield—The company's comprehensive "Rails and Rail Accessories" catalogue is now in its sixth edition. It contains the dimensions, forms, and nomenclatures of the full range of items in general use.

DAVID BROWN INDUSTRIES, LIMITED, Park Works, Huddersfield—The company's new range of "Radicon" worm gear units is the subject of an article in the October-December issue of Newsletter, which contains other features and news of the David Brown organization generally.

THE ENGINEERING CENTRE, Stephenson Place, Birmingham 2—Important developments are about to take place at the Engineering Centre. In mid-1961, a move will be made to new premises, the former Masonic Hall in Broad Street, Birmingham. The November issue of the News Letter gives details of that change and also of other plans which are being undertaken.

INTERNATIONAL HARVESTER COMPANY OF GREAT BRITAIN, LIMITED, 259, City Road, London, E.C.1—Congratulations to Frank Hollis (editor) and all responsible for the production of Harvester Round on the award, by the British Association of Industrial Editors, of a certificate of merit "for high quality of content and presentation" in the 1960 national house journal competition. The autumn issue is to hand and contains a variety of interesting features.

MOND NICKEL COMPANY, LIMITED, Thames House, Millbank, London, S.W.1—Abstracts of a series of articles indicating the fields in which stainless steels are finding application, referring to developments of technical importance, and presenting data on output in the main stainless-steel-producing countries, form an interesting feature of the section of the October issue of the Nickel Bulletin concerned with heat- and corrosion-resisting materials.

ULTRASONOSCOPE COMPANY (LONDON), LIMITED, Sudbourne Road, Brixton Hill, London, S.W.2—The company's new catalogue is designed not only to set out the comprehensive range of equipment available, but also to be a valuable fundamental reference book for the newcomer to the field of ultrasonic non-destructive testing. More than half the space is devoted to the basic principles of ultrasonic testing and descriptions of some of the techniques used for the more common applications.

J. & J. DYSON, LIMITED, Griff Works, Stannington, near Sheffield—The year 1960 is the sesqui-centenary of the company and publication of its "Casting Pit Refractories and Special Fireclay Shapes" catalogue is intended to mark this anniversary and also, in the longer term, to serve as an introduction and reference to the service which the company offers to steelmakers. With the earlier publication, "Fired Fireclay Refractories," which dealt specifically with steelfoundries, available literature now covers a very wide field.

ENGLISH ELECTRIC COMPANY, LIMITED, Welding Division, East Lancashire Road, Liverpool 10—There is a lighthearted yet sound approach to a technical subject in a new 56-page booklet "Weld-ability," issued by the company. Designed to go into a welder's pocket and liberally illustrated with cartoons and simple diagrams, the booklet is full of tips for better welding. Its aim is to talk to the man on the job, the welder, a craftsman who often has very definite ideas on the electrodes he wants to use. The first half of the booklet deals with the principles of good welding, detailing the necessary equipment and types of welds, explaining terms, symbols, and British Standards. The second part covers English Electric arc-welding electrodes and equipment. There is a helpful section at the end on welding troubles, their cause and cure.

## New Plastics-coated Steel Sheets

AN entirely new product—a plastics-coated sheet for the cladding of buildings—is being displayed by Dorman Long (Steel), Limited, at the Corrosion and Metal Finishing Exhibition in London this week. The sheets, particularly suitable for use on industrial buildings and areas where atmospheric pollution exists, are coated on both sides and all edges with a new polyvinyl chloride composition, "Vynasol," developed by G. A. Willis, Limited.

Produced in a range of eight colours, the sheets have exceptionally high resistance to abrasion, impact, humidity, and chemical attack. Accelerated weathering tests have demonstrated that after the equivalent of 25 to 30 years' normal weathering the "Vynasol" coating still gave the sheets excellent protection.

The new sheets will be available either corrugated or as "Scandinavian" tiles.

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PRODUCTION of bituminous coal and lignite in the US during October, according to the Bureau of Mines, US Department of the Interior, was 34,805,000 net tons, compared with 34,165,000 net tons in the previous month and 34,921,000 net tons in October, 1959.

# APPLICATION OF THE LD PROCESS TO HIGH-PHOSPHORUS IRON

## *Technique Adopted by the Pompey Steelworks*

By A. BRUNO

EVOLUTION of processes for refining iron with pure oxygen has been rapid and much has been written about them. Nevertheless, steel companies who wish to build a new steelworks are likely to be embarrassed by the choice of processes. The two processes which appear at present to be of most interest and destined to be developed industrially are the LD process with its offshoots and the Kaldo process.

In the LD process oxygen is blown vertically at a high pressure into molten iron contained in a fixed vessel[1]. The process is being used in many countries for treating low-phosphorus iron (less than 0.5 per cent.) and some very large steelworks are finding the technique developed at Linz and Donawitz[3] entirely satisfactory.

In the Kaldo process the oxygen is blown at low pressure and obliquely into molten iron contained in a vessel which rotates about an axis inclined at about 20 deg. to the horizontal[2]. The process has been applied on an industrial scale for refining high-phosphorus iron at the Domnarvet works where it was first developed and a new plant for the process has recently started at a large French steelworks[4].

### Modified LD Techniques for Treatment of High-phosphorus Iron

The LD process has long been considered unsuitable for the treatment of iron high in phosphorus.[5, 6, 7] The Pompey steelworks was the first to develop, during the years 1956 and 1957, on a pilot plant, a technique which allows of the application of the LD process to phosphoric iron[8], and has since then produced 20,000 metric tons of steel in 18-ton casts by this technique. Although this has been a period of development, some 90 per cent. of this tonnage has been equivalent in quality to OH steel.

Two other modified LD techniques for use with high-phosphorus iron were subsequently evolved. Firstly, the OCP process, later called the LD-AC process, which was developed in Luxembourg, at the Dudelange steelworks, of ARBED, in collaboration with the Centre National de Recherches Metallurgiques of Liège[9], and secondly, the OLP process, developed in France at the Denain steelworks of the Société Usinor by the Institut de Recherches of the French iron and steel industry.[10, 11, 12] These two processes differ from the standard LD process in using lime in powder form carried by the oxygen jet. This method ensures the presence of finely divided lime at the point of impact of the oxygen jet on the bath of metal, that is to say, on the spot where the chemical reactions take place, with the maximum intensity and where the temperature it at its highest.

At the present time many companies in different countries are intending to put in new plants to use these processes, either by making modifications to an existing steelworks or by building an entirely new steelworks, and it is therefore of particular interest to recall the results obtained by the Pompey steelworks without the injection of lime powder, results which have led to a decision being made to build an industrial plant using lime in small lumps. These results have shown that it is possible to refine high-phosphorus iron by the LD process, using lime in the form normally used in the Thomas process, either by adding this lime in large quantity before blowing or by making progressive additions during the blow itself.

The industrial plant at Pompey, designed for a production of 5,000 metric tons of LD steel per month and fitted with modern equipment for charging lime and ore as well as with a device for removing dust from the fume, is situated inside the Thomas steelworks itself.

The monthly programme of 5,000 metric tons of LD steel, which is additional to that of the other melting plant specializing in the making of alloy steels, is comprised approximately of 45 per cent. of mild and semi-mild killed steel and 55 per cent. of rimming steel with various carbon contents.

In describing the Pompey technique particular attention will be given to the economic advantages resulting from recovery of the final slag, the production of rimming steel, the various possibilities of the process, the quality of the product, and the cost of LD steel made by the technique described.

### The LD Process at the Pompey Steelworks and Economic Advantages of Recovering the Final Slag

The method of working is based on the following principles:—

(*a*) Two-phase working with deslagging of a slag rich in phosphorus ($P_2O_5$=20 to 25 per cent. at end of the first phase, the metal then having a carbon content of the order of 1 per cent. (this content can vary in accordance with the carbon content required in the finished steel).

(*b*) Tapping through a taphole which allows the retention in the hearth of the final working slag, rich in iron oxide and free lime. This practice gives economic advantages, but is not indispensable metallurgically.

(*c*) Use of ore and scrap as cooling agents. Scrap, which allows of a more precise temperature control, is generally used in the second phase, whereas ore is preferred in the first phase so as to economize in scrap, which is usually reserved for the electric or the OH furnaces.

(*d*) Introduction of lime and ore during blow by means of a spout which ensures delivery of these materials on to the centre of the bath.

The features of the vessel used at Pompey and its different operating positions are shown in Figs. 1 and 2 and the course of a heat is depicted in Fig. 3. A simple calculation shows the economical advantages which can be gained from recovery of the final slag. It is assumed that analysis of the metal is determined by the analysis of the slag, and hence that for the comparison of working with and without recovery of the final slag the same slag analyses can be assumed in both cases.

The balance-sheet in Table 1 indicates that, on the above assumptions, recovery of the final slag shows an advantage, per metric ton of iron treated, of:—

| | |
|---|---|
| 36.5 kg. of CaO, say 40 kg. of lime at 50 NF/t .. .. | NF 2.0 |
| 25.6 kg. of molten iron at 250 NF/t .. .. .. | 6.4 |
| 5.1 cu. m. of oxygen at 0.14 NF/cu. m. .. .. .. | 0.7 |
| 5.5 kg. of P recovered about .. | 1.3 |
| Total, say, new francs .. | 10.4 |

equivalent to a saving of about 4 per cent. in the cost price of the steel.

If it is desired to have a particularly low-phosphorus steel, it is necessary to use larger amounts of lime, and therefore of slag, in the second stage of working. As this slag is fully recovered, the cost price is therefore independent of the grade being obtained.

In addition to this economic advantage, it should be noted that there is only the one type of slag, and there is no need to skim before tapping, which thus saves time and eliminates a risk of loss of metal. On the other hand, there are two minor difficulties. Firstly, as the loss of iron by oxidation is reduced, the amount of heat available for remelting scrap is equally reduced. This is partly compensated for by the fact that the sensible heat of the slag removed at the end of the first phase is lower, since the total amount of slag is less than when the final slag is not removed. Secondly, about 3 min. is lost in charging, since the presence

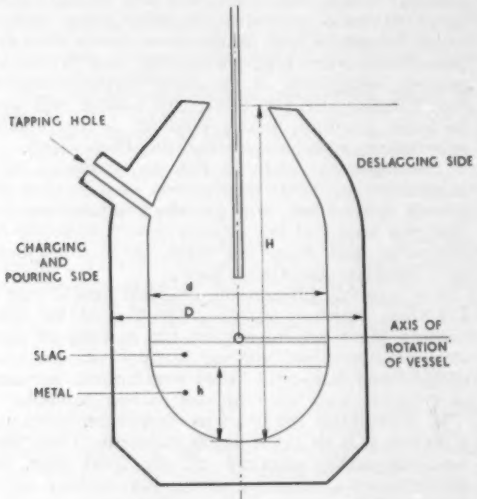



FIG. 1.—LD VESSEL AT POMPEY.

DIMENSIONS

d.—2.4 m., volume, 15 cu. m.
D.—3.5 m., tonnage, 20 tons.
H.—4.5 m. h.—1.05 m.

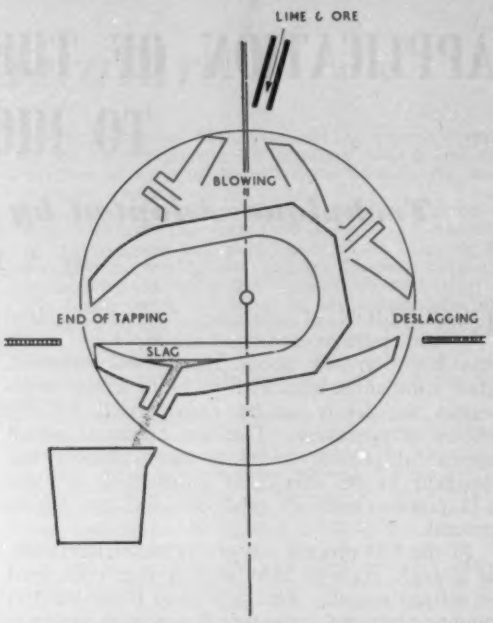



FIG. 2.—VARIOUS POSITIONS OF POMPEY'S LD VESSEL.

TABLE 1.—*Economic Balance-sheet of the LD Process Without and With Recovery of Final Slag.*

| | Without recovery of final slag. | With recovery of final slag. | Gain with recovery. |
|---|---|---|---|
| Weight of iron | 1,000 | 1,000 | |
| Weight of slag recovered | | 128 | |
| *First stage:* | | | |
| P to be removed | 16 | 16 | |
| $P_2O_5$ equivalent | 36.6 | 36.6 | |
| Add $P_2O_5$ brought by slag recovered | | 12.8 | |
| Total $P_2O_5$ | 36.6 | 49.4 | |
| Slag with 23 per cent. $P_2O_5$ | 159 | 214 | |
| CaO required | 79.5 | 107 | |
| Less CaO in slag recovered | | 64 | |
| CaO to be charged | 79.5 | 43 | |
| *Deslagging:* | | | |
| Weight of cleaned slag | 119 | 174 | |
| Weight of FeO loss | 11.9 | 17.4 | |
| *Second stage:* | | | |
| P to be removed | 2 | | |
| $P_2O_5$ equivalent | 4.6 | | |
| Add $P_2O_5$ in slag not removed | 9.2 | | |
| Total $P_2O_5$ | 13.8 | | |
| Final slag with 10 per cent. $P_2O_5$ | 138 | | |
| CaO required | 69 | | |
| Less CaO in slag not skimmed off | 20 | | |
| CaO to be charged | 49 | | |
| *Cast in ladle:* | | | |
| Weight of slag lost | 138 | 10 | |
| Weight of FeO lost | 41.4 | 3 | |
| *Balance:* | | | |
| Total CaO to be charged | 128.5 | 92 | 36.5 |
| Total FeO in skimmed slags | 53.3 | 20.4 | |
| Equivalent to weight of Fe of | 41.5 | 15.9 | 25.6 |
| and volume of $O_2$ in cub. m. | 8.3 | 3.2 | 5.1 |
| P saleable as phosphatic slag | 12 | 17.5 | 5.5 |

(All weights are given in kg.)

This balance-sheet is made out for the conversion of 1 metric ton of pig-iron under the following given conditions:—

Analysis of iron: P = 1.8 per cent.

Analysis of metal on first slagging: P = 0.2 per cent.

Analysis of first slag: $P_2O_5$ = 23 per cent.; FeO = 10 per cent.; CaO = 50 per cent.

Analysis of final slag: $P_2O_5$ = 10 per cent.; FeO = 30 per cent.; CaO = 50 per cent.

In both cases slag remaining on bath after first deslagging = 40 kg. (88 lb.). In the case where slag is recovered, 10 kg. are lost in ladle.

of an oxidized slag in the converter compels pouring of the iron to be done cautiously.

This study shows that the loss of the final slag is a form of waste which cannot be allowed. Thus, in the practice where the final slag is recovered, the addition of lime in the first phase becomes so small that, if made in the form of powder in the oxygen jet, the concentration of lime is less than 1 kg. per cu. m. of oxygen, especially if a little lime has been added before charging to dry out the slag retained in the hearth and to facilitate charging of the iron. Can such a low concentration greatly modify the behaviour of the charge? If a higher concentration is essential for the lime powder to be effective, it is then necessary either to forgo recovery of the final slag or else to increase the volume of the first phase slag and thereby dilute the $P_2O_5$, reduce the fluidity and increase the iron loss.

Experience has proved, however, that the powdered lime can be omitted and that, contrary to what has frequently been stated[12, 13, 14]: the formation of slag does not require the addition of fluxes, particularly of fluorspar. The citric solubility of the slag taken off is consequently excellent. The iron content of the first-phase slag is not high since it is regularly found to be below 10 per cent. As for the phenomenon of ejection and overflowing of slag which has been the main difficulty encountered during the development of this technique, it can now be affirmed that strict control of blowing conditions, and particularly of the position of the lance, allows this problem to be solved perfectly.

## Brief Description of Making a Mild Rimming Steel

After charging the iron on top of the slag from the previous melt the first blow is begun. The slag is then solid, its temperature and its iron oxide content having been lowered by stirring with the iron.

*First phase.*—The amount of oxygen to be blown in to get the final required carbon content and the necessary addition of ore to obtain a temperature of 1,600 deg. C., at deslagging has been calculated and represented graphically. All blowing in the first phase is done at high pressure, and to begin with the lance is in the low position. At the end of 6 to 7 min. decarburization is very lively as the slag has not yet formed in spite of the rise in temperature. Dephosphorization has not advanced very far. The slag needs a flux to make it fluid. The lance is then raised so that, with the

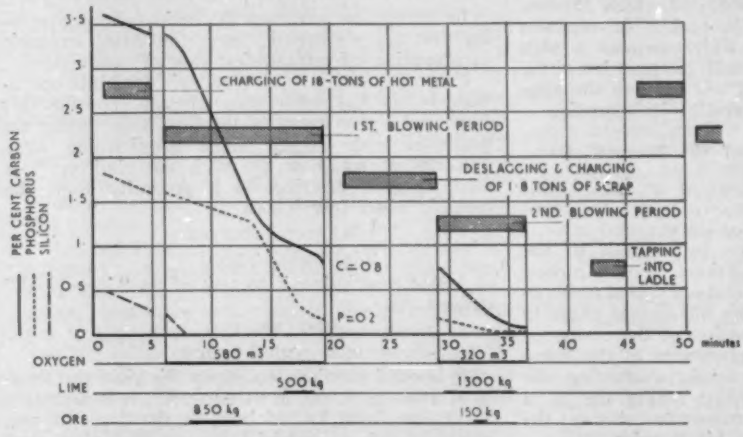



FIG. 3.—COURSE OF A HEAT IN THE LD VESSEL AT POMPEY.

slag-metal action being less violent, the iron oxide content of the slag may increase in spite of the high carbon content of the metal.

The slag then forms, this being evident visually (disappearance of metallic sparks—gentler flame—reduction in red fume) and audibly (reduction in noise). Dephosphorization speeds up and the slag, which is rising in temperature and which is getting richer in $P_2O_5$, requires less and less FeO to remain fluid. The lance is then gradually lowered, the movement of the lance being controlled by the operator according to the appearance of the flame. Blowing is now silent. The crucible of which the volume is equivalent to 0.8 cu. metric ton, is full of slag, but no overflowing is taking place. The necessary lime is now added. The operation is stopped when the necessary amount of oxygen has been blown in. The slag which is quite fluid and free of metal granules is now skimmed off. While this is being done, the temperature is taken and a sample of metal is taken for carbon analysis. After deslagging a quantity of scrap is charged, this being calculated in such a way that further cooling by ore is necessary.

*Second phase.*—Blowing is resumed always at high pressure, and progressive additions are made of lime (in practice 75 kg./m. ton of steel). During the blow, calculations are made of the amount of oxygen to be blown in and of the further amount of ore to be added to get the correct temperature. At the end of the operation, blowing conditions are adjusted to the required pitch, and blowing must be less violent (lance higher and pressure lower) in proportion as the final carbon content is to be higher, this being in order to allow the slag to oxidize and to get a lower phosphorus content in the steel.

The charge is then tapped, the use of a taphole allowing additions to be made without re-phosphorization, since the slag only gets into the ladle at the very end of tapping. The time from the end of the previous tapping to the end of blowing of the second phase is 35 to 40 min., of which 21 min. are for blowing oxygen. The period between taps does not exceed 45 min., which ensures a high production rate, since, as will be seen later, the crucible hearth can be used without any stoppage from the beginning to the end of its campaign.

### Other Possibilities of the Process

The LD process also allows of grades of steel being made with higher carbon content, the blowing operation being stopped at the required content. The higher this content, the better must be the control of the blowing conditions. For a carbon of over 0.15 per cent., it is necessary to stop blowing one or more times during the second phase to take samples because observation of the course of decarburization from the appearance of the flame is of no assistance whatever in evaluating the carbon content. The operator makes use of a standard decarburization curve to choose the moment when he must take his samples.

It is obvious that, in the case of special casts, the time from one tap to the next is increased, owing to the checks which are required and to the corresponding idle periods. Production of killed steels does not present special difficulty since the taphole allows of very clean pouring into ladle without danger of re-phosphorization.

A large number of high-carbon killed steel casts have thus been made. It has been possible to make the whole range of OH steels, but, as the speed of decarburization is very high, it has not been possible to obtain precise control of the carbon content to the same degree as in the OH furnace itself, where refining is much slower. All the same, it has been possible, with carbons up to 0.40 per cent., to keep within the limits of 0.06 per cent., which meets the requirements of the French standards for constructional steels.

### Quality of Steel Produced

As the production programme of the Pompey steelworks is an extremely varied one, it is not possible to give at present complete results for any given grade of steel. Investigations have been made chiefly to find out for what grades the LD process could be adopted. About 50 per cent. of the steel has been made in extra mild rimming qualities, intended for use particularly in the production of discs for the motor industry and of wire for cold stamping. Some 40 per cent. has been made of rimming grades with higher carbon obtained by stopping at the required carbon. Finally, 10 per cent. has been made in killed grades with carbon contents ranging from 0.06 to 0.70 per cent.

For all these grades, LD steel, with its low S and $N_2$ contents, has shown itself to be at least as good in quality as OH steel of the same type, thus confirming the results obtained in the LD steelworks using low-phosphorus iron[15].

### Economic Bases for Cost of Steel Made by the Pompey Technique

In conversion processes the main factors governing cost are:—Cost of charge (including oxygen); consumption of refractories; rate of production.

*Cost of Charge.*—The metal yield of this operation is, as has been seen already, considerably improved by recovery of the final slag. Since the processes with oxygen allow of charging large amounts of scrap or ore with the pig-iron, it is misleading to describe, as is generally done, the metallic yield (per 1,000) as

$$\frac{\text{total metal charged}}{\text{total metal tapped}} \times 1{,}000$$

A better description is to talk of an "iron yield," defined as

$$\frac{\text{iron charged}}{\text{total metal tapped}} \times 1{,}000.$$

In normal running conditions this yield per thousand averages 1,050, in other words, it is necessary to charge 1,050 kg. of iron, in the form of pig, scrap, or ore, to obtain 1 m. ton of molten steel in ladle. It should be remembered that this iron

balance is practically independent of the grade being made.

Percentage iron loss is spread over the following, approximately:—

| | |
|---|---|
| Iron in slag .. .. .. | 15 |
| Iron in fume .. .. .. | 10* |
| Metal ejections .. .. .. | 10 |
| Loss during deslagging .. .. | 15† |

Scrap can be melted to the extent of 300 kg./ton of iron, equivalent to 85 kg. of ore. Recovery of the final slag also allows the consumption of lime and oxygen to be reduced to their theoretical minimums, which are, respectively, 100 kg. and 60 cu. m. (2,120 cu. ft.) per ton of pig-iron, some of which may have been brought by the ore.

With the scrap-ore mixed cooling which has been effected, the average consumption should be, per 1 ton of steel in ladle:—

| | | |
|---|---|---|
| Iron | 980 kg. | |
| Scrap | 100 kg. | } 1,087 kg. metallic charge |
| Ferro-Mn | 7 kg. | |
| Ore | 55 kg. | |
| Lime | 100 kg. | |
| Oxygen | 50 cu. m. | |

*Consumption of Refractories.*—The most suitable refractory for lining LD crucibles seems to be dolomite, which is available in France in large quantities and of which the price is very much lower than that of other basic refractories. In the LD crucible it is the upper portion of the lining which wears away quickest and it would perhaps be interesting to adopt construction of it in two parts, as done in a German steelworks. It is the presence of a liquid slag during most of the blow which is the cause of this rapid wear. The behaviour of the bottom of the crucible presents no problem, nor does that of the taphole.

Consumption of dolomite depends partly on the equipment of the dolomite shop and on the quality of the work done there. It also depends upon the nominal capacity of the crucible. For a vessel of average capacity—30 tons for instance—and with a well-equipped dolomite shop, this consumption could be of the order of 13 kg./m. ton. It will be necessary to wait for some industrial experience to confirm this figure, which is based partly on forecasts of what the life of the linings will be, and partly on the MgO content of the first phase slags. In any case, the consumption of dolomite will be very much lower than that which is necessary to maintain the hearth of an OH furnace.

*Rate of Production.*—The LD crucible has the advantage of being able to be used without stoppage from the beginning to the end of the campaign, since there is no need to change the bottom nor to clean the spout. It is reasonable to assume that the lining of an LD converter should last for 180 to 200 charges. If it be agreed that a stoppage of 12 shifts of 8 hr. each, that is four days, is necessary for relining, this corresponds to a stoppage of 32 min. per cast. Taking the cycle from cast to cast when making a low-carbon rimming steel as 45 min. on average, an LD crucible can produce, on average, $\frac{24 \times 60}{77}$, that is, a little more than 18 casts a day.

In an LD steelworks, if the casting pit had been well designed and if the fume-cleaning plants are independent, a number of crucibles can run at the same time, practically independent of one another. The LD steelmaking plant should then, in practice, when making mild rimming steel, keep to a rate of 18 charges per day per converter, which means that an LD steel plant, fitted with three converters of 30 tons each, can cast about 1,500 metric tons per day. This performance can be improved by reducing the stoppage time for remaking linings, which is possible, according to the results obtained in certain existing LD steel plants.

This quick examination of the elements of costing will enable firms who wish to adopt this process to calculate, by application of data for their own case (price of pig-iron, price of scrap and ore, price of oxygen, labour costs, interest on capital, etc.), the cost of steel of OH quality which would be produced in their works by using the technique described above. The cost so found is practically independent of the fluctuations in the price of trade scrap, as the scrap used in the LD process mainly comes from croppings arising in production.

## Conclusions

For a long time it was admitted that it was not possible to treat phosphoric iron by the LD process under acceptable technical and economic conditions. The results obtained by Pompey show that it is indeed possible to produce steel of OH quality by this process under very normal economic conditions and with complete use of the materials consumed. They also show that it is possible to work with uncrushed lime and without adding fluxes. A large German steelworks, fitted only a short time ago with a 60-ton converter, has also now confirmed these results by producing many thousands of tons by this process.

The various processes for converting iron by pure oxygen are now being developed concurrently and there can be no doubt about their bringing radical changes in the layout of works and in the marketing of steels made by the use of pure oxygen. The ore market will also be influenced by the application of oxygen processes, which can also be used for refining medium-phosphoric irons.

* This figure will be verified when the fume-cleaning apparatus is in service.

† These losses are relatively high. It ought, however, to be possible to reduce them by an improvement in the tilting system of the converter.

REFERENCES

[1] M. Trenkler, "The Refining of Steel with Pure Oxygen Blown in from the Top of the Bath," *Stahl und Eisen*, Aug. 14, 1952.

[2] B. Kalling and F. Johansson, "The Kaldo Process for Converting Pig-iron with Pure Oxygen in a Revolving and Tipping Furnace," *Jernkontorets Annaler*, No. 4, 1957.

[3] O. Cuscoleca and K. Rösner, "The Development and Present State of the LD Process," *Journal* of I.S.I., June, 1959.

[4] B. Kalling and F. Johansson, "Present State of the Kaldo Process," *Journal* of the I.S.I., Aug., 1959.

[5] F. A. Springorum, K. C. Speith, O. Darmann, and H. von Ende, "Industrial Tests of Blowing Thomas Iron with Pure Oxygen," *Stahl und Eisen*, September 19, 1957.

(*Contd. on p.* 1224)

# *Forthcoming Events*

DECEMBER 6

*Institution of Chemical Engineers*:—Meeting at the Geological Society, Burlington House, London, W.1, at 5.30 p.m. "Study on Electro-precipitator Performance in Relation to Particle Size Distribution, Level of Collection Efficiency, and Power Input," by D. O. Heinrich.

*Institution of Production Engineers (Tees-side Section)*:—Meeting at the College of Further Education, Cleveland Avenue, Darlington, at 7 p.m. "The Meaning of Effective Communication in an Industrial Organization," by A. C. Leyton.

*Institution of Production Engineers (Peterborough Section)*:—Joint meeting with the Institution of Plant Engineers at the White Lion Hotel, Church Street, Peterborough, at 7.30 p.m. "Chemical Engineering," by J. C. Veale.

*Institution of Electrical Engineers (North-Western Utilization Group)*:—Meeting at the Engineers' Club, Albert Square, Manchester, at 6.15 p.m. "Electrical Characteristics of the Argon Arc Welding Process," by J. C. Needham and Dr. L. H. Orton.

*Institute of Marine Engineers (North Midlands Section)*:—Meeting at Yorkshire Imperial Metals, Limited, Leeds, at 7.15 p.m. Lecture and film on "Some Aspects of the Use and Fabrication of Non-ferrous Tubes for Marine Pipelines."

*Combustion Engineering Association (Northern Region)*:—Meeting at the Griffin Hotel, Leeds, at 2.30 p.m. "Coal Price Structure," introduced by C. Ramsden, marketing officer, North-Eastern Divisional Coal Board.

*Institution of Production Engineers (Peterborough Section)*:—Joint meeting with the Institution of Plant Engineers at the White Lion Hotel, Church Street, Peterborough, at 7.30 p.m. "Chemical Engineering," by J. C. Veale.

DECEMBER 7

*Institute of Marine Engineers (Scottish Section)*:—Meeting at the Institute of Engineers and Shipbuilders in Scotland, 39, Elmbank Crescent, Glasgow, C.2, at 7.30 p.m. "Recent Developments in the Welding of Pressure Vessels," by Dr. H. Harris.

*Society of Chemical Industry (Corrosion Group)*:—Midlands Branch meeting at the Engineering Centre, Stephenson Place, Birmingham, at 7 p.m. "Cavitation," by D. J. Godfrey.

*Institution of Production Engineers (Nottingham Section)*:—Meeting at the Reform Club, Victoria Street, Nottingham, at 7 p.m. "The Production of Engineering Components from Metal Powder," by J. W. Lennox.

*Institution of Production Engineers (Cornwall Section)*:—Meeting at Cornwall Technical College, Trevenson, Pool, Redruth, at 7.15 p.m. "Process Variability and its Control," by C. S. Smith.

*Institution of Plant Engineers (Southern Branch)*:—Meeting at the Polygon Hotel, Southampton, at 7.30 p.m. "Treatment of Industrial Effluents."

*Institution of Production Engineers (Loughborough College Section)*:—Visit to Quasi-Arc, Limited, Bilston (Staffs), at 10.30 a.m.

*Institution of Production Engineers (Western Section)*:—Meeting at the Large Engineering Lecture Theatre, University of Bristol, University Walk, Bristol 8, at 7 p.m. "Some Aspects of the Future Trends of Manufacturing Techniques," by F. Griffiths.

DECEMBER 8

*Midland Institute of Mining Engineers*:—Meeting at the Danum Hotel, Doncaster. "Recent Developments in Electrical Shotfiring in Coal Mines," by Dr. R. L. Gordon and D. W. Widginton.

*Illuminating Engineering Centre (Glasgow Centre)*:—Meeting at the British Lighting Council, 29, St. Vincent Place, Glasgow, at 6.30 p.m. "The Lighting of Outdoor Industrial Plant," by J. G. Holmes p

*Institution of Plant Engineers (North East Branch)*:—Meeting at Roadway House, Oxford Street, Newcastle-upon-Tyne 1, at 7 p.m. "Fine Measurement," by J. R. Adams.

*Institution of Electrical Engineers (Utilization Section)*:—Meeting at Savoy Place, London, W.C.2, at 5.30 p.m. "The Determination of the Electrical Characteristics of an Arc Furnace," by J. Ravenscroft.

*Institution of Mechanical Engineers (East Midlands Branch)*:—Meeting at the Midland Hotel (Room 42), Derby, at 7.30 p.m. "Advanced Developments in the Design of Diesel Engines," by R. J. Dain.

*Institution of Mechanical Engineers (Western Branch)*:—Meeting at the Engineering Laboratories, University Walk, University of Bristol, at 7 p.m. "General Descriptions of Automatic Control in Industry," by A. L. Stuchbery.

*Institute of Marine Engineers (North East Coast Section)*:—Meeting at Stephenson Building, King's College, Claremont Road, Newcastle-upon-Tyne 2, at 6.15 p.m. "Ship Steering Gears," by W. Spencer Paulin.

*Institute of Marine Engineers (Devon and Cornwall Section)*:—Meeting at the Demonstration Theatre, South Western Gas Board, Radiant House, Derry's Cross, Plymouth, at 7.30 p.m. "Human Problems in Marine Engineering," by C. C. Pounder.

*Institution of Mechanical Engineers (Midland Branch)*:—Meeting at the Midland Institute, Paradise Street, Birmingham, at 2.30 p.m. Repetition of Leonardo da Vinci Lecture: "The Manufacture of Gas Turbines—Applied Science in Practice," by F. Nixon and R. R. Whyte.

DECEMBER 9

*Society of Instrument Technology (Midland Section)*:—Meeting at Gosta Green College of Technology, Aston Street, Birmingham, at 7 p.m. "Training of Instrument Engineers," by Prof. J. E. Parton.

*Junior Institution of Engineers*:—Meeting at Pepys House, 14, Rochester Row, London, S.W.1, at 7 p.m. "A Short History of the Rubber Industry," by F. M. Panzetta.

DECEMBER 10

*Institute of British Foundrymen (Scottish Branch)*:—Meeting at the Royal College of Science and Technology, Glasgow, C.1, at 3 p.m. "New Developments in the Production of Gunmetal Castings," by F. Hudson.

## National Association of Colliery Managers

DECEMBER 5

*South Midland Branch*:—Visit to Cadley Hill Colliery and paper on "Reconstruction at Cadley Hill," by J. R. Gibson.

DECEMBER 8

*South Staffordshire, Warwickshire, Worcestershire, and Shropshire Branch*:—Open forum on "Coal Ploughs."

DECEMBER 13

*Yorkshire Branch*:—Meeting at the Miners' Welfare Hall, Brodsworth, at 3 p.m. "Coal Ploughing in the Beeston Seam at St. John's Colliery," by B. Hatherton, C. Meryett, and A. S. Harris.

DECEMBER 19

*Midland Branch*:—Meeting at the Denman's Head Hotel, Sutton-in-Ashfield, at 6.30 p.m. Paper by F. Turton, manager of Silverhill Colliery.

## APPLICATION OF THE LD PROCESS

*(Cont. from previous page)*

[6] H. Kosmider, H. Neuhaus, and H. Schenk, "Trials of Refining of Pig-iron by Top Blowing with Pure Oxygen," *Stahl und Eisen*, September 19, 1957.

[7] H. Rellermeyer, H. Knuppel, and J. Sittard, "Developments in the Refining of Phosphoric Iron with Oxygen," *Stahl und Eisen*, No. 19, 1957.

[8] L. Lambert and G. Messin, "Application of the LD Process to the Treatment of Phosphoric Iron," C.I.T. Report No. 4, 1958.

[9] A. Decker and P. Metz, "Application of Physical Chemistry to the Basic Oxygen Steelmaking Process," IRON AND COAL, March 4, 1960.

[10] B. Trentini and M. Allard, "New IRSID Process of Refining Phosphoric Irons with Pure Oxygen and Lime Powder," *Revue de Metallurgie*, Jan., 1958.

[11] B. Trentini and M. Allard, "Refining Iron with Pure Oxygen and Powdered Lime," *Revue de Metallurgie*, Dec., 1958.

[12] B. Trentini, P. Vayssiere, and M. Allard, "Comments on the OLP Process," *Journal* of the I.S.I., June, 1959.

[13] Discussion at the A.G.M., 1959, "Recent Applications of Oxygen to Steelmaking," *Journal* of the I.S.I., Jan., 1960.

[14] N. Trenkler and R. Rinesch, "Application of the LD Process to Iron with Average Phosphorus Contents," *Stahl und Eisen*, June 26, 1958.

[15] H. Hauttmann, "Properties of LD Rimming and Killed Steels," *Drei Jahre LD Stahl Vöest*, 1956.

# CENTRAL WORKSHOPS IN COAL MINING

## *Providing an Engineering Service*

PROVISION for maintenance services to meet the rapid introduction of mechanization of the mines was an obvious consideration when the National Coal Board was planning the reorganization of the industry. Before nationalization the industry comprised about 1,000 collieries, of which about 600 were individually owned. There was, therefore, no centralization of engineering workshop services on anything like the scale needed to serve the industry when it was unified in 1947.

Maintenance services had not kept pace with the changes in colliery methods and there was no provision for dealing with the extensive programme of colliery reconstruction which was to follow; still less was there an organization capable of dealing with the intensive mechanization of so many aspects of mining which has been such a feature of the past decade.

The board decided that servicing of equipment should take place in two stages—at colliery level, where there would be a system of preventive maintenance and first-aid repairs, and by another planned system for the reconditioning, at regular intervals, of all mining and other general machinery and equipment, to be provided through the establishment of central workshops which would serve all the collieries in a given area.

It was evident that the centralization of the reconditioning of plant and equipment must result in a reduction in costs and in an improved use of labour, machine tools, and equipment. The cyclic reconditioning of equipment at a central point relieves the colliery workshops of a workload for which they are not equipped. It also enables them to concentrate on their proper task, which is the prevention of breakdowns by a system of planned maintenance. And if maintenance is faithfully discharged at colliery level it has, in turn, an advantageous influence on the period between the cyclic overhaul of machinery at the central point.

### Planning Considerations

Before proceeding to detailed planning it was necessary to consider the experience of the past with the availability of the future. Production losses arising from the breakdown of mechanical equipment were much more serious than those occurring with the use of hand tools; the cost of construction had risen, necessitating the best use of the floor space to be provided; the cost of workshop equipment was rising rapidly and a more careful selection was demanded; there was a shortage of skilled labour, so that the full and economical use of such labour was imperative; there must be knowledgeable management to co-ordinate all these factors into a workable and economical unit, and to ensure that materials and spares were available at the place and time they were required to meet the work load, and also to provide an efficient system of inspection of work to acceptable standards.

From a review of these factors was evolved the system of "Planned Work Flow," which ensures, so far as is possible, the forward progressive motion of all work passing through the workshop with the minimum of back tracking of men and jobs. The necessary parts, material, and instructions are taken to the man instead of the man to the job, thus reducing man travel and gaining the best use of skill and time.

Again the introduction of "Job Breakdown" with process planning procedures for all recurring reconditioning work, setting out the sequences of dismantling and erection with the necessary tools, jigs, and fixtures in their order of use would ensure that skilled men were not employed on work below their level of skill. It was these and other accepted principles which formed the basis of design of the board's central workshops.

### Old and New Workshops

In the older type of shop it was common to find a variety of separate buildings with different heights and widths, and the interiors all too often presented a picture of dirt and confusion. Because of this untidiness a great deal of wasteful movement took place which added to the cost of repair. It was questionable whether the works manager had a clear conception of what was going on and dobutful whether he knew if the workload matched the capacity of the works. Neither was he able to decide with any precision the breakdown of costs on any particular job. While it was true that the older shops often turned out work of high quality they could not, even with their resources of highly skilled and freely available labour, have been able to cope with modern throughput.

In the new NCB shops, the manager sees a much clearer picture. The dirt, inseparable from the stripping operation, is confined to a small area, and he can, by passing from one section to another, observe the movement of work. If he is concerned about accepting a large order he can obtain from the planning office the potential works capacity and the present workload; and from this he can estimate how much new work can be taken in with the minimum disturbance.

If he is worried about any aspect of costs he can, at short notice, receive a figure from the works cost accountant in addition to the periodic return which he normally receives.

The engineering services set up under the board therefore provide something more than could have been dealt with at colliery level; the workshops can send out mobile gangs to supplement existing colliery resources where necessary; they give a service for the recovery, repair, and re-issue of unserviceable parts; act as a centre at which defects can be investigated and modifications carried out, and also serve as a technical training unit for colliery operatives.

### Typical Example of Area Workshops

The central workshop in No. 4 Area of the North-Eastern Divisional Coal Board is an example of how the board's policy for the maintenance of mechanical and electrical equipment is being carried out. It is one of the 21 new or reconstructed workshops throughout the coalfields which have been built to a standard pattern and designed to provide engineering services of the highest efficiency at the lowest cost.

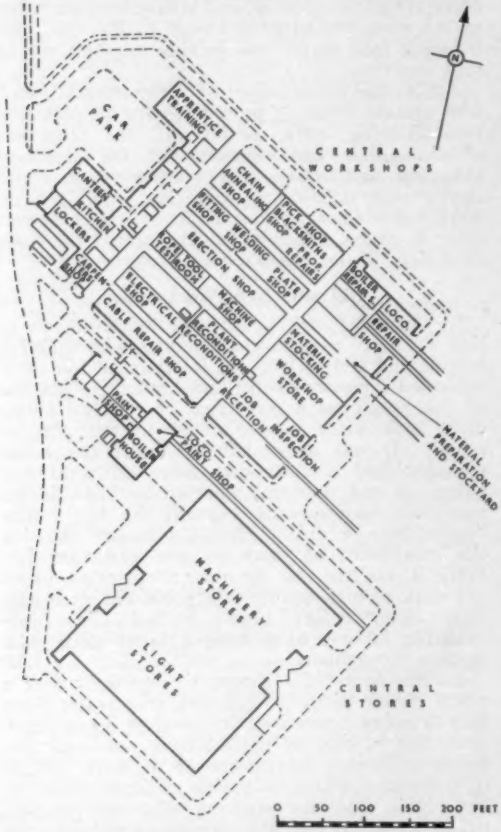



FIG. 1.—LAYOUT OF THE CENTRAL WORKSHOPS, NO. 4 AREA, NORTH-EASTERN DIVISIONAL COAL BOARD.

The cost of constructing and staffing central workshops must be considered in relation to the vast engineering turnover of the coal-mining industry when compared with other industries. The introduction of modern accepted principles of management techniques has been fully justified by the increased efficiency, standards of workmanship and output over those formerly existing, and comparisons between the two sets of circumstances have shown that the savings in the reconditioning of coal cutters alone have nearly met the cost of the staff necessary to operate the techniques for the whole of the workshop.

All workshops have been designed around four basic units:—(1) A holding centre for serviceable equipment; (2) the reception and materials preparation centre; (3) the productive area, and (4) the administration and welfare block. These units are indicated by the accompanying plan (Fig. 1).

The machinery stores have been developed as a holding centre for both equipment awaiting overhaul in the central workshops and finished equipment awaiting despatch to the colliery. All machinery is held on either pallet racks or, if large, is stacked on the floor. A fork-lift truck and overhead crane are provided for handling. Nearby are the light stores for which cranage is not necessary. This is the centralized holding point for all Area stocks and is not directly related to the workshop services.

The workshops consist of a single large working area without dividing walls or partitions. This simplifies supervision and job travel and gives flexibility should changes in the location of any workshop section become necessary due to developments in mechanization.

Sections of the workshop are laid out in accordance with work flow principles and trades are grouped to reduce noise from one side of the shop to the other, and to ensure that service sections, such as the machine shop and tool room, are located as centrally as possible.

The productive area is separated from the administration and welfare block by a cross-service road along which completed work can travel, through the paint shop, to the machinery stores, and from the reception area by a second cross-service road which acts as a "feeder" for work passing into the shops for operation. Overhead cranes with capacities designed to meet maximum planned requirements are installed in each bay.

### Job Reception and Inspection

All mechanical and electrical equipment coming into the shops for overhaul or repair (other than locomotives or rail wagons) is received in the job reception and inspection section (Fig. 2) where it is steam cleaned, stripped down, degreased, and inspected.

After equipment has been inspected, a report, indicating those parts in need of replacement, is passed into the workshop stores adjacent to the

FIG. 2.—JOB RECEPTION AND CABLE REPAIR SECTION.

job reception area; the balance of parts suitable for further service is held on job trolleys or pallets in the "spare parts build up" area to await issue.

Electrical equipment parts are fed from the "parts build up" area into the electrical shop where they are reassembled, passed forward for testing, and then fed along the cross-service road to join the mechanical plant equipment to which it belongs. Some units, such as boring machinery, are finished in the electrical bay and passed direct to the machinery stores.

Flexibility and economy have been gained by the use of unit benches with job stands for the assembly of electrical equipment, and by the introduction of job trolleys or pallet trucks for the transport of components.

The repair of trailing cables is a specialized job and there are few parts to be stripped and reassembled, the main repair work being to locate faults in the length of cable. Thus, the cable repair section (Fig. 2) is a self-contained unit. The cables by-pass job reception and are accepted, examined for faults, repaired, tested, and despatched.

Owing to the vulcanizing time involved in the repair of sheath faults, it has been found possible for one operator to handle two work stations, preparing a fault in one cable on one bench while a repaired fault is being vulcanized on a second bench.

### Plant Reconditioning and Fitting Shop

As with the electrical shop, components are fed from the "parts build up" area into the plant reconditioning and fitting shops (Fig. 3), for reassembly. Here again, the use of unit benches with job stands and parts trolleys or pallets has been adopted to give economic use of floor space and to provide flexibility. The need for flexibility is apparent when it is appreciated that a coal-cutter unit may occupy an area of 3 ft. by 2 ft. 6 in., whereas a large haulage unit can occupy a floor area of 30 ft. by 10 ft.

After units have been assembled they are passed forward in this area to "mate-up" with the appropriate electrical equipment; the finished machine is then tested and passed along the cross-service road for painting and despatch.

The machine shop has been equipped to meet the specific needs of an overhaul service. The selection and the capacities of individual machines is determined by the work load assessed for the shop and can vary from one area to another dependent upon the amount of mining machinery in

FIG. 3.—PLANT RECONDITIONING SECTION, MACHINE SHOP, AND TOOLROOM.

use. The board's policy is to provide machines capable of reconditioning worn parts and not for the production of new parts.

Adjacent to the reception area are the workshop stores designed to carry a supply of mining machinery spares sufficient to meet the scheduled overhaul programme. These stores are laid out to provide both binning and pallet storage, and are provided with a separate entrance with a pre-binning check area, and a pre-selection area for the build up of parts to meet planned assembly.

Adjacent to the workshop stores, and on the same side of the cross-service feeder road, is the materials preparation and covered raw materials stockyard area. Limited stocks of plate, bars, and sections are stored to meet the immediate planned workshop needs; they are also cut in this area to meet the requirements of the blacksmiths, platers, or machine shops from schedules prepared by the planning section.

FIG. 4.—BLACKSMITH'S SHOP AND HEAT-TREATMENT SHOP.

The plating and welding shops are mainly engaged on the repair of pit cages, washery and screening plant, chutes, and conveyor structures. Down draught hearths are used to eliminate the dust and to improve working conditions generally.

In view of the vast amount of lifting gear and haulage equipment in use in the collieries it is necessary to provide a specialist service for the annealing and testing of ropes and chains. As this does not involve other workshop sections, the annealing shop is situated on the cross-service road with direct access from outside, thereby reducing the need for internal transport.

The blacksmiths' shop, shown in Fig. 4, undertakes work of a general nature including the sharpening of picks for coal cutters and the forging of brackets and similar small parts for use in the plate and welding sections.

Locomotive and boiler repair shops form part of the productive area, although they are sited adjacent to the materials preparation section. This is because locomotives must be hauled into the shop along rail tracks and to site it elsewhere would only involve track laying, and consequently waste working space.

The paint shop is situated between the main workshops block and the machinery stores and is placed on the direct route of completed equipment passing from the shops to maintain flow and avoid back travel. The paint shop consists of three main units—a high shop with rail tracks and staging for painting locomotives, a general paint shop for painting reconditioned equipment with a screened spray for treating smaller assemblies, and a paint stores. This shop also has a small store for housing the equipment used by the mobile gang attached to the workshops.

An apprentice training centre has been incorporated into the workshops' layout. School entrants are introduced to the initial use of hand tools and elementary machine tools. They are provided with a separate entrance to the training centre and have their own locker facilities.

The administrative and welfare block is clearly divided. The staff entrance gives access to the administrative offices, which are positioned to reduce walking time to a minimum. The inquiry desk and telephone switchboard, the drawing office, and library are on one side of the entrance; the offices of the workshop manager, cost section, and time clerks are on the other.

## *Powder Metallurgy Meeting*

WINTER meeting of the Powder Metallurgy Joint Group of the Iron and Steel Institute and the Institute of Metals will be held at Church House, Great Smith Street, London, S.W.1, on December 15, at 2.30 p.m., and December 16 at 9.30 a.m. and 2 p.m.

Two papers on "Sintered Stainless Steel" will be presented and discussed on the opening day, while the whole of the next day will be devoted to a symposium on "Practical Aspects of Pressing Metal Powders," based on 13 papers. Copies of Powder Metallurgy, Nos. 5 and 6, containing the papers to be presented and discussed, may be obtained for 12s. 6d. each, post free, from the Secretary, Powder Metallurgy Joint Group, 17, Belgrave Square, London, S.W.1.

Visitors will be welcome to attend the meetings; tickets are not required.

# DURGAPUR : A TECHNICAL SURVEY

## Story of a Great Achievement

"LOOKING at the fast-changing skyline of Durgapur it requires almost a flight of imagination to think of the place as being once a jungle hideout for Dacoits. Not very long ago—not even a decade—Durgapur was an unknown forest area served by. . . ." So writes K. Sen, ICS, one of the contributors to the "Technical Survey of the Durgapur Steelworks," just published by IRON AND COAL in collaboration with ISCON—the Indian Steelworks Construction Company, Limited.

Mr. Sen, who is general manager, Durgapur steel project, Hindustan Steel, Limited, writes vividly of the tremendous developments in the area during the last 10 years, the central feature being the construction of the Durgapur Barrage on the Damovar river which was completed in 1955. Even before the Durgapur steel project was decided upon in 1956, Durgapur had become a symbol of the new India. The network of canals which has been started from the Durgapur Barrage, will ultimately feed more than 1,000,000 acres of land. It is also the key to electric power in the area and will facilitate transport.

The decision to set up the third State steelworks in this area has given international prominence to Durgapur and, of course, the steelworks is the central theme of this volume. Nevertheless, while this publication of over 200 pages of subject matter is truly remarkable in its completeness of technical detail of the new integrated iron and steel works, it is also something more than a technical compendium. Its treatment of the subject—whether intentionally or unintentionally—is such that the Durgapur steel project becomes alive in the mind of the reader. It appears as a triumph of a highly co-operative venture between India and Britain.

### Meeting the Quest for Knowledge

Durgapur, now known internationally, is, however, known rather vaguely and perhaps distortedly because the information about it published hitherto has, of necessity, been piecemeal. There must be many people—not all steelmakers—whose curiosity and imagination has been aroused by what they have heard and who wish to know more about some aspect or other of this great project. This technical survey will satisfy their quest for knowledge.

In a foreword, Mr. Malcolm Macdonald, PC, retiring High Commissioner for the United Kingdom in India, describes the Durgapur steelworks as "a grand contribution to India's economic development under her succession of Five-Year Plans." Referring to national enterprise in India, he goes on to say that "none of India's friends desires its success more sincerely than do the British Government and people."

The first contributor, Mr. G. Pande (chairman, Hindustan Steel, Limited), writing on "Steel in the Public Sector," puts the British project in Durgapur in its true perspective by giving the salient facts about it alongside those of the other two major steel projects, namely, the integrated steelworks being built at Rourkela and Bhilai by the Germans and Russians, respectively. There then follows a series of authoritative background articles on the administrative, sociological, technical, and manning of this integrated steelworks. This series includes an article by Sir Eric Coates, who led the UK Steel Mission which went to India in 1955 in response to the Government of India's invitation to the British Government to advise, under the Technical Co-operation Scheme of the Colombo Plan, on the establishment of an integrated iron and steel works in India.

The remainder of the book, which is edited by F. H. Harley, is divided into four main sections, each with many sub-divisions, as follows:—

WORKS LAYOUT AND DESIGN.—General layout of the works; materials balance; energy balance; civil engineering design; standardization of the plant.

PLANT LAYOUT AND DESIGN.—Coke ovens and by-product plant; ironmaking plant; steelmaking; rolling-mill plant; rolling mills' electrical equipment; wheel and axle plant; central engineering maintenance department; iron and steel foundry; power plant; general services; transportation; administrative building.

CONSTRUCTION ON THE SITE.—Site organization and management; housing and welfare; civil engineering construction.

MANNING THE WORKS.

The cover has a clean and striking appearance with a view of the top of a blast furnace silhouetted against a night sky. The book is well set out with many illustrations and has two fold-out blueprints, one of the layout of the steelworks and the other of the layout of the rolling mills.

Copies are obtainable from The Publisher, IRON AND COAL, John Adam House, 17-18, John Adam Street, Adelphi, London, W.C.2. The price is 21s. (22s. 9d. post free in the UK).

# Cold Extrusion of Steel

ORGANIZED by the Institute of Sheet Metal Engineering, a conference on the cold extrusion of steel was held in the City Hall, Sheffield, last week under the chairmanship of Mr. A. E. Gilbert, chairman of the council of the institute and a director of J. J. Habershon & Sons, Limited, Rotherham.

The first speaker, Dr.-Ing. H. D. Feldmann, of Cold Forging, Limited, said: "Cold forging is the production method of the future because it saves material and production time, and therefore production time, and therefore production labour. It is not so universal that it will be able to replace other competitive methods completely, but it will take over part of them, and become a new economical production method for certain operations." He said that before the last war German industry used cold forging to produce munition parts in mass production, and America took over their experience. Britain was later in the field.

Dr. Feldmann stated that the greater the quantities, the more economical was the method. It benefited from standardization of components, even between different firms, and this was the increasing practice in America and Russia. These methods would also have to be employed in Europe in order to remain competitive. "For instance, if all car manufacturers agreed to a standardization of certain parts which they all used, it would be possible to produce these parts much more economically than at present."

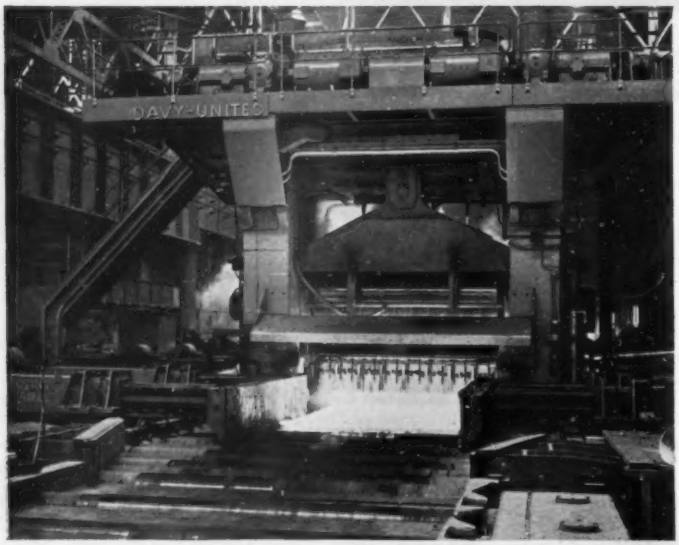
Other lecturers in the three-day programme were Mr. R. E. Okell (Forgings & Presswork, Limited); Prof. Dr.-Ing. O. May (Technische Hochschule, Stuttgart); Mr. F. Griffiths (British Motor Corporation, Limited); Mr. R. A. P. Morgan (Royal Ordnance Factory, Birtley, Co. Durham); Mr. D. James (Pyrene Company, Limited); Mr. A. W. F. Comley (Wilmot Breeden, Limited); Mr. H. Ll. D. Pugh, Mr. M. T. Watkins, and Mr. J. McKenzie (National Engineering Laboratory); Mr. F. Howard, Mr. H. A. J. Dennison, and Mr. N. Angus (Production Engineering Research Association), and Mr. Melvin Verson (Verson Allsteel Press Company, Inc., Chicago).

# CONSETT IRON'S NEW PLATE MILL

FIRST phase of the current development scheme of the Consett Iron Company, Limited, is nearing completion with the commissioning of the company's new 4-high plate mill at Hownsgill, Consett (Co. Durham).

This mill is designed to produce 10,000 tons a week of steel plate in sizes ranging from $\frac{3}{16}$ in. upwards in thickness, and up to 120 in. wide and 90 ft. long.

Nearly half a mile long, and designed after intensive study of American and continental methods, the Consett Iron Company's mill will be one of the most up-to-date mills in the world.




A REAR VIEW OF THE MILL STAND IN THE NEW FOUR-HIGH PLATE MILL OF THE CONSETT IRON COMPANY, LIMITED, SHOWING A PLATE BEING ROLLED.

It includes processes common to all plate mills, but also some which are more unusual, such as equipment for pressure quenching and tempering of special steels and shot-blasting of plates followed by protection of shotblasted surfaces.

There are also many elaborate testing procedures to be carried out on some plates, including ultrasonic examination.

Consett Iron Company's new plate mill is costing £14,000,000 and is part of a development scheme on which nearly £30,000,000 is being spent.

In connection with this scheme, work has already commenced on preparing a site for a new steelmaking plant which will be the first in the world to use both the LD and Kaldo oxygen processes.

*In common with many other industries, ore processing presents many difficult problems to the control engineer. Some of these are discussed by M. J. Cahalan, B.Sc.(Eng.), M.I.M.E., and R. Wolski, B.Sc. (Eng.), in a paper on "Automatic Control in Mineral Processing" presented during the International Mineral Processing Congress held in London from April 6 to 9 and organized by the Institution of Mining and Metallurgy. The appended abstracts are confined to methods of control, followed by brief references to the crushing, grinding, and flotation processes. The full proceedings of the conference are available from the institution, price £5.*

# AUTOMATIC CONTROL in MINERAL PROCESSING

## Its Development and Difficulties Encountered

GENERALLY speaking, all existing techniques of automatic control can be applied to the mineral processing industry. A modern system aims at control according to a predetermined plan, with the values of all plant parameters maintained at levels determined by experience or by a laboratory or pilot-plant experiment. The quality and the quantity of output from the plant is therefore dependent on the cumulative effect of all input components, which are controlled either individually or made to obey a required sequence.

In order to change the quality or the quantity of the output it may be necessary to alter a great number of the levels of control and centralized control panels have been developed to provide such facilities. The measuring elements transmit their signals either electrically or pneumatically to receiving instruments located in a control room.

Control levels are set on the instruments and the control signals are sent back to the plant to operate the regulating elements. Continuous recording of plant variables by means of individual chart recorders can be replaced with automatic data-logging equipment, and such equipment can be designed to print out measured plant data, as well as provide automatic supervision of the performance of the control equipment and of the plant itself.

The most sophisticated equipment would therefore comprise remote transmitting measuring elements, a centralized control panel with facilities for remote/manual controls and a comprehensive data-reduction system with facilities for computation of such functions as efficiencies, specific consumption of materials, and so on. In addition, advanced analytical instruments can be used for automatic control of specific operations. For instance, the feed of flotation reagents can be controlled automatically with the aid of an instrument such as a polarograph in one control loop, with the equipment measuring and computing the mass flow of material through a given section of flotation circuit. Metal content analysis can also be made automatic and the laboratory work is thus reduced to the checking of the calibration of the automatic equipment.

The essential quality of such a system is still far away from an automatic plant. It is, however, a practical system and almost all its elements have been applied successfully. Progress in the field of analytical instruments is so fast nowadays that there is little doubt that automatic control will quickly follow the development of satisfactory measuring techniques. The next step would be a much more comprehensive system employing a master controller, possibly in the form of a digital computer. The duty of such a machine would be to supervise the operation of all the individual control loops and make the necessary adjustments in accordance with the information fed back from the plant and with the programme of work set by plant management. A plant fitted with an up-to-date system of controls would be readily adaptable to this step.

The replacement of existing control equipment would not be necessary and additional items and small alterations would not disrupt the normal working of the plant

Looking still further into the future, the generation of control signals will be done by the master machine. The programme of work, the characteristics of the process, and the plant equipment will be built into the machine and the data obtained by measuring elements will be treated by the master controller to produce control signals applied directly to the regulating elements. However, even this step will not result in an automatic plant; more than one start/stop push-button will still be required to operate the plant.

Discussing the type of control equipment available and the possibilities of application of the most up-to-date elements of a comprehensive plant control system the authors, with regard to crushing,

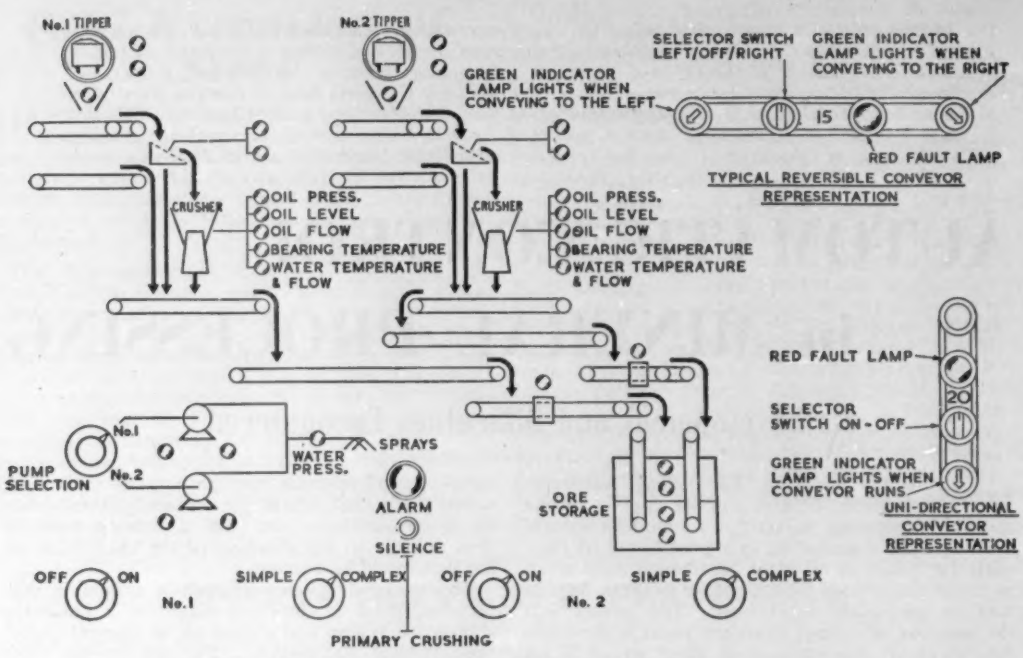



FIG. 1.—PRIMARY AND SECONDARY CRUSHING CONTROL PANEL.

state that, starting with run-of-mine ore, the more important controls would include a system of interlocks providing for automatic "start-up" and "shut-down" and for safeguarding the plant equipment. The control signals incorporated in such a system would come from instruments measuring the level of ore in storage bins, the loading of crushing machinery, the loading of conveyors, and from devices providing indication of abnormal conditions.

Gamma-ray switches have now been used for several years to indicate the level of materials, and properly engineered equipment is sufficiently reliable and hazard-proof.

For the detection of the continuity of flow a comparatively new but already proved device is available. It responds to the energy imparted by the passing material on to the sensing element and it is essentially an "on-off" device. Such an instrument could provide alarms of blocked hopper discharge points or of interrupted flow in closed pipes.

With automatic belt-conveyor tensioning equipment, ferrous and non-ferrous tramp-metal removal, continuous belt weighing—either mechanically or electrically by means of load cells—the whole transportation of material can be under close control. In addition, closed-circuit television can be used with advantage for visual observation of critical points. Starting and stopping the crushing sections could be done remotely from the control panel which would have a functional mimic diagram of the plant equipment to aid the operator. Crushing and transportation machinery would be indicated for "running," including direction, "stopped," and "idling."

The control of the product size from the crushing process depends largely on the plant machinery and with one or two exceptions the existing designs preclude automatic control. A considerable amount of manual labour can be eliminated. however, by providing equipment for automatic particle-size analysis, determination of circulating loads, and determination of screen efficiences. An automatic ore sampler, supplying samples to a suitable type of multi-deck screening machine, and automatic weighing of the products obtained, would make the particle-size analysis fully automatic. The necessary elements of such a system do exist and putting them together is an entirely practicable proposition and, with crushing machines of the floating shaft type, closer control of the crushing process could be achieved. A similar sampling and particle-size analysis system would also provide a frequent check on the efficiency of screens.

Fig. 1 shows a typical mimic panel for the central control room of a crushing plant.

Regarding grinding, the authors recall that impressive savings in the running costs of mineral dressing plants have been quoted as due to automatic control of this process. There are, they state,

few industrial cases where an economic evaluation of successful automatic control could be more convincing; indeed with modern equipment, the grinding process can be controlled to quite narrow limits.

Many early attempts to use intensity of noise emitted by a grinding mill as a control parameter failed because the noise-measuring equipment employed was not specifically designed for that duty and other methods tried were equally unsuccessful for similar reasons. The development of accurate noise-measuring equipment has made it possible to use a selected narrow range of noise frequencies, thus eliminating the disturbing effects of other machinery, such as motors or gearboxes. Several plants already use this technique for automatic control of feed to the mills. It is thus now practicable to measure and control most of the parameters of the grinding operation.

The operation of a flotation stage, the authors point out, involves a large number of variables, some clearly defined such as pulp density, and others almost defying definition, such as quality of froth.

Here, then, they say, is an operation where the choice of parameters for control becomes extremely difficult, since the effects of interactions between variables can be significant. Factorial design methods have largely overcome this difficulty of interactions in laboratory testing, but in plant practice the problems are formidable. A few clearly defined variables, such as pulp density, reagent additions, and air admission, can be controlled fairly easily. It is possible to control contact time by regulation of the inter-cell weirs, but, since this means a change in froth depth, adjustment of the froth overflow level is also needed.

A recent suggestion is that analytical instruments should be used to examine the effects of many variables, thus improving metallurgical efficiency by anticipating the effect of certain variables and correcting circuit conditions. In practice, solution and ore analyses would be made, together with measurements of density, flow and time, and data-processing equipment would be used to analyse information so obtained to find a set of conditions best suited to the ore of a particular composition. Circuit conditions would then be automatically adjusted by analysis of the incoming ore.

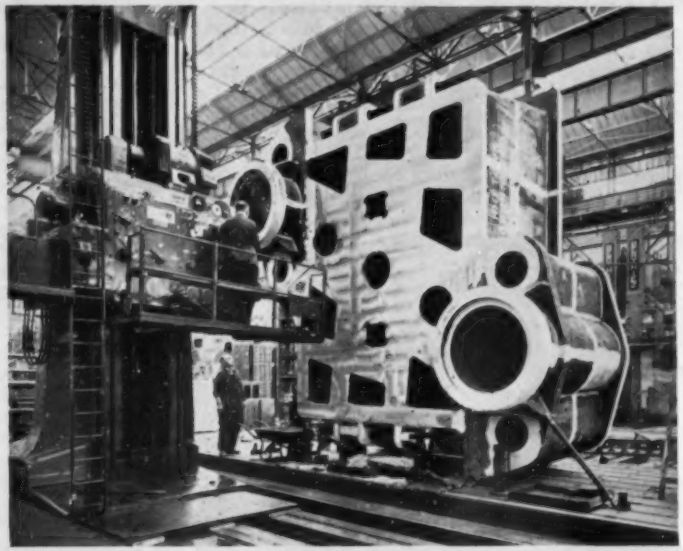
The authors proceed to review equipment already available, discussing gravity concentration, electrostatic and gravity separation, filtration, and other treatments. They point out, however, that the costs of a control scheme along lines indicated are likely to be high, and that all the requirements present many complex problems; but the instrument industry of today can offer solutions which go a long way towards the final aims.

## A Davy-Ashmore Job

THIS fabricated 100-ton fixed crosshead for a 3,000-ton drawdown-type forging press offers a good example of the inter-linkage now being developed between the various works of the Davy-Ashmore group for steelworks plant.

It was designed by the Davy & United Engineering Company, Limited, at Sheffield, fabricated by Ashmore, Benson, Pease & Company, Limited, at Stockton-on-Tees, and then returned for machining to Davy-United's Darnall Works at Sheffield.

This photograph was taken at the Darnall Works.



AN ORDER for 40,000 tons of steel railway rails has been placed by the Indian Railways with the Yugoslav Zenica steelworks, Bosnia, according to a report published by Handelsblatt, Düsseldorf.

CONSTRUCTION OF A STEELWORKS in Indonesia with Russian aid is announced by the Antara Agency, which states that the Soviet Government has granted a $2,500,000 credit to the Indonesian Government for this purpose.

# Introduction of Rotary Impact Crusher

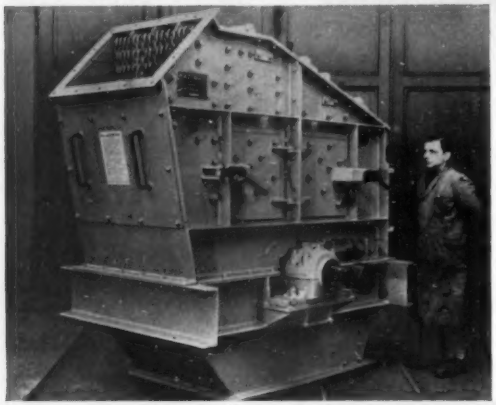
PROVISION of sales, spares, and servicing facilities throughout Britain is announced by Joy-Sullivan, Limited, Greenock, for the Joy-Hazemag impact crusher, manufactured by Hazemag G.m.b.H., of Munster, Westphalia, Germany. Manufacture of spare parts in this country will commence immediately; in the near future the complete units will be made here.

Among the advantages of particular value to the coal-mining industry is the ability of the Joy-Hazemag crusher to produce stowing material of cubical shape without flats. It will give selective preparation of middlings, grain preserving crushing of lump coal to coking coal fineness, and will reduce washed fine coal to specification with the requisite degree of conformity in the resulting grain classes. Mixing of various coal components can also be carried out without the inconvenience of accumulations of slurry caused by the addition of filter mud.

The only moving part in the Joy-Hazemag crusher is the rotor, which is mounted horizontally inside a rigid fabricated casing of heavy steel plate.

At intervals along the periphery of the rotor a number of impact bars of manganese or other high-grade alloy steel are mounted. Heavy impact plates of similar steel are pendulously hung above the rotor from the top of the casing. The clearance between these plates and the rotating blow bars can be varied quickly from outside the machine.

A heavy chain curtain is suspended across the inlet hopper to retain the material while breaking is in progress. A perforated steel chute inside the crusher allows undersize to by-pass the rotor.



JOY-HAZEMAG IMPACT CRUSHER.

As the feed enters the crushing chamber the rapidly moving impact bars subject it to a succession of blows, shattering it and throwing it against the impact plates tangentially to the periphery of the rotor. Still further breaking occurs through impact of the material on itself.

The crusher is manufactured in four series, each of which comprises a number of models of different capacities. The heavy-duty series is designed for hard rocks, slags and aggregates and the standard duty series for primary and secondary crushing of limestones, friables, coal, salt, etc. The medium-duty series deals with the secondary and tertiary crushing of limestone, coal, etc., and a fast running model for fine crushing and fiberizing. All crushers except those in the last series are fitted with blow bars of either the solid bolted-on or shoulder type, or the "slot" ("S") type which can be quickly changed when required. The above series covers a range of capacities up to 500 ton/hr.

As the Hazemag is relatively small and requires only light foundations, installation cost is low. Supporting girders need only be capable of carrying twice the machine's deadweight. Maintenance costs due to wear are also low because of the relatively low rotor speeds used.

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# *Mining Equipment at Czech Fair*

DEVOTED mainly to engineering, the second international fair at Brno, Czechoslovakia, in September, attracted exhibitors from many nations. Britain was represented by Holman Bros., Limited, Camborne (Cornwall), and British Jeffrey-Diamond, Limited, Wakefield (Yorks).

Drills and geological proving equipment were demonstrated by Svenska Diamantbergborrnings AB (Craellus), of Stockholm. Czechoslovakia exhibited models of large excavators for open-cast mining and Poland a wide variety of mining machinery and equipment.

Among the equipment shown by the USSR was a PKG-3 tunnelling machine This machine, which cuts a roadway 14 ft. in dia., is provided with hydraulic roof supporting jacks and is propelled by two tracks mounted one on each side. It is claimed that the machine is capable of advancing 160 ft. in an 8-hr. shift, removing 280 tons of debris.

Power is provided by a 49.5-kW. motor which propels the combine and drives the four cutting heads at speeds of 14, 17, 50, and 86 r.p.m. The total weight of the machine is 17 tons and it is served by a conveyor with a capacity of 90 ton/hr.

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YUGOSLAVIAN STEEL OUTPUT for 1960 will total 450,000 tons, compared with 300,000 tons in 1959, according to the Tanjug Agency, quoted in Echo de la Bourse (Brussels).

# INDIAN COAL STATISTICS

## Report of Chief Inspector of Mines

OUTPUT of coal in India in 1958 broke the previous year's record of 43,295,088 tons, increasing by 4.5 per cent. to 45,226,767 tons, according to "Indian Coal Statistics, 1958," issued by the Chief Inspector of Mines. Despatches of coal amounted to 40,260,269 tons in 1958, against 37,588,657 tons in 1957, while coal stocks at collieries at the end of the year were 2,723,255 tons, compared with 3,234,315 tons 12 months earlier.

Coal consumed at collieries and for domestic consumption amounted to 4.8 per cent. of the output. In addition, a little over 7 per cent. of the output was used for coke making at colliery coke ovens, from which 1,788,051 tons of soft coke and 355,093 tons of hard coke were obtained.

The average daily number of persons employed in coal mines was 382,172, against 370,244 in 1957. The Jharia coalfield employed 130,581 workers and Raniganj 128,691. Men formed 89 per cent. of the labour force and women 11 per cent. The number of manshifts worked was 111,574,341 in 1958, against 107,080,658 in 1957, while the percentage of absenteeism was 13.2 (13.7) per cent.

### Wages and Productivity

Wages in the coalfields continued to be governed by the award of the All-India Tribunal, which became effective on May 26, 1956. Beside the basic wages, cost-of-living allowances, and other cash payments, essential foodstuffs such as rice and wheat were also supplied at concessional prices. The following figures of wages refer to cash wages only. Average weekly earnings increased from Rs. 18.74 in 1957 to Rs. 20.86 in 1958, the average weekly number of hours worked remaining the same at 47.86.

The productivity of workers, based on the output per worker per man-year, showed a slight decrease for miners and loaders and for all workers employed underground and in open-cast workings, the figures being 335 tons and 174 tons, respectively, in 1958, against 339 tons and 175 tons in 1957. Overall, the average output per worker per year showed a slight increase, from 117 tons in 1957 to 118 tons in 1958. Output per manshift was unchanged at 1.14 tons and 0.41 ton, respectively, for miners and loaders and for all workers, but in the case of open-cast and underground workers, the o.m.s. showed a slight decrease from 0.61 ton in 1957 to 0.59 ton in 1958.

Statistics of accidents are compiled from the notices of accidents submitted to the Chief Inspector of Mines and from the reports of Inspectors who inquire into the accidents. Serious accidents are those in which the injuries sustained involved permanent loss, injury to the sight or hearing, the fracture of a limb, or the enforced absence of the injured persons from work for a period exceeding 20 days.

Two major accidents at Chinakuri and Central Bowrah collieries were mainly responsible for the unusually high number of deaths in accidents at coal mines in the year under review, accounting for 199 out of the total of 420 fatalities. The death rate per 1,000 workers consequently increased considerably, from 0.49 in 1957 to 1.1 in 1958, while the corresponding serious injury rate showed a relatively lower increase from 7.46 to 7.55.

### Power Machinery and Equipment

According to the report, 449 coal mines were using electricity in 1958 and had installed 294,476 h.p., against 419 with 269,865 h.p. in 1957. The number of coal-cutting machines worked by electricity increased from 573 in 1957 to 584 and the total quantity of coal cut by them rose from 9,910,543 tons to 10,518,681 tons. The maximum number of mechanical loaders in use in any month was seven, against five in 1957. The average number of mechanical conveyors in use decreased from 92 in 1957 to 68. The number of mechanical ventilators in operation was 323, or 19 more than in the previous year. The number of safety lamps in use was 57,942. During the year, 3,819,937 kg. of permitted explosives, 2,022,486 kg. of high explosives, and 2,299,283 kg. of gunpowder were used in coal mines; the number of detonators used was 15,215,505.

Statistics available show that India exported 1,801,660 tons of coal and coke in 1958, valued at Rs. 55,761,487. Principal destinations of coal exports, including lignite, were:—Ceylon, 101,833 tons; Ethiopia, 5,016 tons; Egypt, 7,122 tons; Japan, 19,848 tons; Eastern Pakistan, 862,561 tons; Western Pakistan, 346,005 tons; Singapore, 5,000 tons; and South Vietnam, 11,088 tons. Of the 87,780 tons of coke exported, Burma took 13,214 tons, Eastern Pakistan 17,825 tons, and Western Pakistan 47,397 tons.

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### Sweden's Mining and Metal Industry

Turnover in Sweden's mining and metalworking industries rose by 9 per cent. in 1959, according to the Central Bureau of Statistics. The survey covers 437 companies with a total of 273,000 employees. Gross profits were up 10 per cent., net profits 15 per cent., and total dividends 7 per cent. The figures reflect the general upswing which increasingly marked developments in 1959. Several sectors within the industries under review showed considerable variations from the general trend. This is particularly true of shipbuilding, which reports lower turnover and profits in 1959 than in 1958.

# *New Patents*

PATENTS below are among the complete specifications accepted listed in the Official Journal (Patents). The numbers given are those under which the specifications have been printed and all subsequent proceedings will be taken.

Applications for copies of the full specifications (3s. 6d. each, post free) should be made to the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.2.

### Mining and Mining Appliances

847,384 EGGEMANN, W., and CAMPENHAUSEN, VON E. (trading as SCHWARZ KOMM-GES., H.). Prop support systems for mines.
846,926 ANDERSON, BOYES & COMPANY, LIMITED. Rotary cutter drums of mineral-mining machines.
847,386 NOE, O. Hydraulic pitprop.
846,947 HUNT, T. A. Miners' cap lamps.
847,012 PREPARATION INDUSTRIELLE DES COMBUSTIBLES. Guided skip hoists.
847,442 INGERSOLL-RAND COMPANY. Percussive rock drills.
847,470 HILL PORTER (NEWCASTLE), LIMITED, and TALBOTT, A. C. Collapsible load supporting mechanism for use in mines.
847,348 LOBBERT & COMPANY, G.m.b.H. Supports for the walls and roofs of mineworkings.
848,005 RUBBER IMPROVEMENT, LIMITED, and LEWIS, J. Conveyor, elevator, or transmission belting.
847,934 BOCHUMER EISENHÜTTE HEINTZMANN & COMPANY. Gallery supporting systems for underground working.
848,229 DOWTY MINING EQUIPMENT, LIMITED. Hydraulic pitprops.
848,121 GERLACH, K., and GERLACH, H. Roof bar for underground workings in mines.
849,094 BADE & COMPANY, G.m.b.H. Advancing arrangements for tunnelling machines.
848,751 HAARMANN, A. Advancing support system for mineworkings.
849,162 COAL INDUSTRY (PATENTS), LIMITED. Ripping machines.
848,815 HAARMANN, A. Pitprop for mineworkings.
848,947 PREPARATION INDUSTRIELLE DES COMBUSTIBLES. Skips for skip hoists.
848,964 SOC. DES FORGES ET ATELIERS DU CREUSOT. Guide mechanism for lift cabins or mine cages.
849,289 HOY & COMPANY, LIMITED, A. Coal-cutters and tool-carrying chains therefor.
848,534 VANWERSCH, A. Mine-roof bars.

### Metallurgy and Engineering

847,259 JACKMAN & COMPANY, LIMITED, J. W., and HENRIKSON, M. G. Cupola and blast furnaces.
847,430 STRATEGIC-UDY METALLURGICAL & SMELTING PROCESSES, LIMITED. Smelting of titaniferous iron ore and ilmenite.
847,327 WEAN EQUIPMENT CORPORATION. Apparatus for treating strip.
847,198 KOPPERS COMPANY, INC. Continuous radiant furnace sintering machine.
847,814 RÖCHLING'SCHE EISEN- UND STAHLWERKE G.m.b.H., formerly ADMINISTRATION SEQUESTRE DES RÖCHLING'SCHE EISEN- UND STAHLWERKE G.m.b.H. Steels for products in particular springs of which high fatigue vibration strength is required.
847,831 BOCHUMER VEREIN FÜR GUSSSTAHL-FABRIKATION A.G. Production of heavy steel ingots.
848,219 COLVILLES, LIMITED. Method of producing slag in fragmented or particulate form.
847,638 KOCKS, G.m.b.H., F. Rolling mills.
847,640 SIMON-CARVES, LIMITED. Treatment of industrial effluents.
847,848 BRITISH OXYGEN COMPANY, LIMITED. Treatment of ferrous material.
848,230 SOC. DES BLANCS DE ZINC DE LA MEDITERRANEE E. CHABAURY-P. G. INDRE & CIE. Process of separately recovering aluminium, iron, and titanium values from material such as red mud containing said values.
847,967 STAHL- UND WALZWERKE RASSELSTEIN/ANDERNACH A.G. Coating metal strip by hot dipping.
847,854 DORTMUND-HÖRDER HÜTTENUNION A.G. Vacuum method of refining steel.
847,862 SCIENTIFIC RESEARCH INSTITUTE, LIMITED. Method and apparatus for the vacuum treatment of molten metals.
847,864 BRITISH OXYGEN COMPANY, LIMITED. Removal of sulphur from blast-furnace slag.
847,865 BRITISH OXYGEN COMPANY, LIMITED. Removal of sulphur from blast-furnace slag.
848,280 VACUUM INDUSTRIAL APPLICATIONS, LIMITED. Process for the degasification of molten steel.
848,192 DORTMUND - HÖRDER HÜTTENUNION A.G. Apparatus for degasifying steel melts.
848,905 JESSOP & SONS, LIMITED, W. Alloys.
849,161 COLMOL COMPANY. Self-contained mobile power-driven conveyor systems.
848,567 KINZOKU ZAIRYO KENKYUSHO. Method of treating iron and steel to remove dissolved oxygen.
848,841 HOLMAN BROS., LIMITED. Dust extractors for rotary abrasive tools and other dust-producing tools.
849,230 OHIO CRANKSHAFT COMPANY. Induction heaters for billets.
849,015 FISHER & LUDLOW, LIMITED. Chain conveyors.
849,313 SALLE STEEL COMPANY. Metallurgical process for treating steel.
848,482 STAVELEY IRON & CHEMICAL COMPANY, LIMITED, RILEY, R. V., and DEEMING, A. G. Pipe-spinning apparatus.
849,031 LINDEMANN, W. Scrap briquetting presses.
848,512 ALLEGHENY LUDLUM STEEL CORPORATION. Process for producing silicon steel.
849,173 UNITED STATES STEEL CORPORATION. Light shielding apparatus for detectors of pin holes in moving strip.
848,498 HÜTTENWERK OBERHAUSEN A.G. Rolling of rods.
848,631 TITANIUM METALS CORPORATION OF AMERICA. Melting of refractory metals.

### Fuel Treatment and Utilization

847,519 HARTMANN, W. Comminuted coal fines and method of comminuting agglomerated coal fines.
847,840 GREAT LAKES CARBON CORPORATION. Process of manufacturing coke.
848,840 SOC. DE TECHNIQUE INDUSTRIELLE. Manufacture of smokeless fuel.

# THE COAL TRADE

WHILE retail business is brisk in most parts of the country, it has fallen off slightly since the winter prices came in and the exceptionally mild weather has not helped the merchants. The lack of variation in the industrial trade indicates the steadiness of the market and the fact that most of the larger consumers have sufficient stocks to provide for any emergency. The improved trade in exports and bunkers from North-east Coast ports is gratifying, but it is disappointing that similar improvement cannot be reported from the North-west Coast area where trade, at its best, is no better than "steady."

### SOUTH-WEST LANCASHIRE

House-coal trade is getting into its winter stride, although business is not yet nearly as good as it is hoped it will be later in the year. Generally supplies are satisfactory, although it is necessary to make up shortages in the allocated fuels by the addition of substitute tonnage. In many cases the substitute fuels offered are not up to the required standard, but merchants are pleased to receive these qualities in order to keep abreast of their house-coal orders.

There are fairly good stocks at most of the depots, and if the day-to-day supplies can be maintained as at present there should be no serious difficulties in the immediate future. There is an increasing demand for smokeless fuels for household use and such qualities as "Coalite" and "Rexco" are an expanding market. Deliveries of both these qualities are, at present, satisfactory.

Demand for stove fuels is not yet very heavy and on the whole supplies of anthracite stove nuts and "Phurnacite" are sufficient to meet present needs although anthracite is somewhat slow in delivery. The gas coke market continues its steady expansion, mainly for central heating and industrial purposes. Larger quantities of gas coke nuts are also being used for domestic purposes, but there is no difficulty in meeting the full needs of the public at present. The general industrial position is being satisfactorily maintained with full allocations available.

The bunker trade at the Merseyside docks, which at one time made a considerable contribution to these ports, is now very small and supplies are readily available. Coastwise trading continues to be extremely quiet and orders received are executed promptly.

Average retail prices (per ton) are as follow:—Group 1, 212s. 8d.; Group 2, 193s. 3d.; Group 3, 176s. 5d.; Group 4, 164s. 8d.; Group 5, 151s. 7d.; Group 6, 141s. 5d.; Group 7, 127s.

## REDUNDANCY HITS WILLIAM BEARDMORE

ABOUT 280 employees of William Beardmore & Company, Limited, Glasgow, are to be paid off in the next two or three months. The lack of demand for heavy armour plate, the substantial drop in demand by the shipbuilding and electrical industries for heavy forgings and castings, and the reduction in selling prices have contributed to the redundancy.

The company states that new and additional production has been developed in the manufacture of stainless steel, rolled alloy blooms, and fully hardened forged work rolls. While these developments help to keep the steelmaking departments fully occupied, a policy of concentration has been adopted in the heavy engineering shops. In the heavy engineering forge nearly 800 men are at present working a four-day week.

## Coal Chartering

OVERALL volume of tonnage taken up for coal is still at a minimum and while there is still some general demand from Hampton Roads to normal destinations there is, however, no sign of any general improvement and rates of freight show little change from those last effected.

Hampton Roads/Antwerp, Rotterdam, Amsterdam reports 15,000 tons for December 5/15 at 26s. and a 13,500-tonner to same destination for December 25/January 15 at 3d. less, both cargoes being relets, and at about these figures further tonnage could doubtless be fixed. The rate from the Roads to Japan is still steady at $8.30 and at this figure large November tonnage has been fixed to Moji-Muroran Range, which is repeatable. Hampton Roads/Cork reports $4.75 for about 7,000 tons early November shipment and to Brazil 11,000 tons for December 5/20 has been arranged to Rio de Janeiro at $5.20.

Other fixtures include Gdynia or Gdansk to Italian Adriatic at 31s. for about 8,400 tons December 10/31, and there is a fair inquiry from the Continent to the Mediterranean, apart from the demand for tonnage to load fertilizers. Lourenço Marques/Colombo reports 9,000 tons for November/December at 48s. 3d. f.i.o. and trimmed.

Nothing has been reported from the UK to the Mediterranean, but there is a small demand and coasting tonnage is still required from West Coast and East Coast UK to the Continent and Scandinavia, respectively.

## Nuclear Power Consortium Wins £55,000,000 Contract

WORK is to start next April on the nuclear power station at Sizewell (Suffolk). The English Electric—Babcock & Wilcox—Taylor Woodrow Atomic Power Group, Limited, has been awarded this £55,000,000 contract for the latest and biggest plant in the UK.

Generating 650 mW of power, 580 mW of which will be fed to the 275-kV supergrid, the new station will bring, when completed in 1966, the total power of Britain's nuclear power stations to 3,000,000 volts—over 10 per cent. of the country's generating capacity.

RICHARDSONS, WESTGARTH & COMPANY, LIMITED, marine, turbine and electrical engineers, of Wallsend-on-Tyne—The board has decided to make no payment of interim dividend, but hopes to make a reduced distribution when results for the full year, ending April, 1961, are available.

# British Blast Furnaces in the September Quarter, 1960

(These tables are published through the courtesy of the British Iron and Steel Federation.)

*Derbyshire, Leicestershire, Notts, Northants, and Essex.*

| Name of firm. | In blast at end of the third quarter, 1960. | | | | | Weekly average in blast. | Total existing at end of quarter. |
|---|---|---|---|---|---|---|---|
| | Hematite. | Basic. | Foundry and forge. | Ferro-alloys. | Total. | | |
| Ford Motor | — | — | 1 | — | 1 | 1 | 1 |
| Holwell Iron | — | — | 1 | — | 1 | 1 | 4 |
| Renishaw Iron | — | 1 | 1 | — | 2 | 1·3 | 2 |
| Sheepbridge | — | 2 | — | — | 2 | 2 | 2 |
| Stanton Ironworks: Stanton-by-Dale | — | 2 | 3 | — | 5 | 5 | 5 |
| Staveley Iron & Chemical | — | 1 | 3 | — | 4 | 4 | 4 |
| Stewarts and Lloyds: Corby | — | 4 | — | — | 4 | 4 | 4 |
| Wellingboro' Iron | — | 2 | — | — | 2 | 2 | 3 |
| TOTAL | — | 12 | 9 | — | 21 | 20·3 | 25 |

*Lancashire (excl. N.-W. Coast), Denbighshire, Flintshire, and Cheshire.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Brymbo Steel Works | — | 1 | — | — | 1 | 1 | 1 |
| Darwen & Mostyn Iron | — | — | — | 1 | 1 | 1 | 2 |
| Lancashire Steel Manufacturing | — | 2 | — | 1 | 3 | 3 | 4 |
| Summers, John | — | 2 | — | — | 2 | 1·9 | 2 |
| TOTAL | — | 5 | — | 2 | 7 | 6.9 | 9 |

*North-West Coast.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Barrow Ironworks | 2 | — | — | — | 2 | 2 | 4 |
| Charcoal Iron | — | — | — | — | — | — | 1 |
| Millom Hematite Ore & Iron | 2 | — | — | — | 2 | 2 | 3 |
| United Steel: Workington | 2 | — | — | 1 | 3 | 3 | 3 |
| TOTAL | 6 | — | — | 1 | 7 | 7 | 11 |

*Lincolnshire.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Appleby-Frodingham Steel | — | 4 | — | — | 4 | 4 | 4 |
| Lysaght's Scunthorpe Works | — | 3 | — | — | 3 | 3 | 3 |
| Thomas, R., & Baldwins: Redbourn | — | 3 | — | — | 3 | 2·3 | 3 |
| TOTAL | — | 10 | — | — | 10 | 9.3 | 10 |

*North-East Coast.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Consett Iron | — | 3 | — | — | 3 | 2.7 | 3 |
| Dorman Long (Steel): Acklam | — | 2 | — | — | 2 | 2 | 4 |
| Redcar | — | — | — | — | — | — | 2 |
| Bessemer | — | 2 | — | 1 | 3 | 3 | 3 |
| Clay Lane | — | 2 | — | — | 2 | 2 | 2 |
| Gjers, Mills | 2 | — | — | — | 2 | 2 | 3 |
| Skinningrove Iron | — | 2 | — | — | 2 | 1.9 | 3 |
| South Durham Steel & Iron: West Hartlepool | — | 2 | — | — | 2 | 2 | 3 |
| Cargo Fleet | — | 2 | — | — | 2 | 2 | 3 |
| TOTAL | 2 | 15 | — | 1 | 18 | 17.6 | 26 |

*Scotland.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Bairds & Scottish Steel: Gartsherrie | — | 1 | 1 | — | 2 | 2 | 4 |
| Carron | — | — | 1 | — | 1 | 1 | 2 |
| Colvilles: Clyde Iron Works | — | 3 | — | — | 3 | 3 | 3 |
| Ravenscraig | — | 1 | — | — | 1 | 1 | 1 |
| TOTAL | — | 5 | 2 | — | 7 | 7 | 10 |

*South Wales and Monmouthshire.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Guest Keen Iron & Steel: Cardiff | — | 2 | 1 | — | 3 | 3 | 4 |
| Thomas, R., & Baldwins: Ebbw Vale | — | 3 | — | — | 3 | 2.5 | 3 |
| Steel Company of Wales: Margam | — | 4 | — | — | 4 | 4.5 | 5 |
| TOTAL | — | 9 | 1 | — | 10 | 10 | 12 |

*Lord Boyd-Orr Says:*

## Unfetter East-West Trade

IN his presidential address to the annual general meeting of the British Council for the Promotion of International Trade last week, Lord Boyd-Orr called for an entirely new look at East-West trade relations and suggested: "It is high time we ceased playing politics with East-West trade."

He believes that our exports to the planned-economy countries could be increased to £500,000,000 a year if we did. At present our exports to these markets are running at about £150,000,000 a year.

Lord Boyd-Orr illustrated how the total foreign trade of the Eastern bloc is rising year by year as a result of a sustained economic growth of about 10 per cent. a year.

During the first nine months of 1960, Britain's exports to China increased 70.2 per cent., compared with the same period in 1959; to the Soviet Union and Eastern Europe 53.6 per cent., and to Western Europe 12.3 per cent.

Among the British industries which for over 10 years have benefited from East-West trade are the suppliers of iron and steel, whose shipments to the planned-economy countries for the first nine months of this year amounted to £11,586,236.

### End Embargo

Lord Boyd-Orr's new look at East-West trade relations envisages:—

Taking up the Soviet offer to conclude a long-range trading plan for 15 years ahead; dismantling import restrictions to bring the planned-economy countries into line with the

Dollar Area and most other markets; ending the embargo on certain British exports.

Easing credit arrangements; a scheme of financing to help manufacturers wishing to accept "mammoth" orders for engineering goods; a more ambitious programme of technical exchanges between East and West to acquaint the buyers in the planned-economy countries with the quality of British technical products.

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HALL-THERMOTANK, LIMITED—Arrangements are being made to place £700,000 7 per cent. cumulative preference shares with institutional investors. It is also proposed to modify the rights of the existing £120,000 6 per cent. stock, while raising the interest rate to 7 per cent. While the year ended last September was a successful one for UK subsidiaries, several of the oversea companies have experienced difficulties.

## British Blast Furnaces in the September Quarter, 1960—*continued*

*Staffordshire, Shropshire, Worcestershire, and Warwickshire.*

| Name of firm. | In blast at end of third quarter, 1960. | | | | | Weekly average in blast. | Total existing at end of quarter. |
|---|---|---|---|---|---|---|---|
| | Hematite. | Basic. | Foundry and forge. | Ferro-alloys. | Total. | | |
| Goldendale Iron | — | — | 1 | — | 1 | 1 | 2 |
| Shelton Iron & Steel | — | 3 | — | — | 3 | 3 | 3 |
| Stewarts and Lloyds: Bilston | — | 1 | — | — | 1 | 1 | 2 |
| TOTAL | — | 4 | 1 | — | 5 | 5 | 7 |
| *Sheffield.* | | | | | | | |
| Park Gate Iron & Steel | — | 2 | — | — | 2 | 2 | 2 |
| GRAND TOTAL | 8 | 62 | 13 | 4 | 87 | 85·1 | 112 |

**Weekly Average Number of Furnaces in Blast during the September Quarter, 1960, and the Previous Four Quarters**

| District. | 1959. | | 1960. | | |
|---|---|---|---|---|---|
| | Sept. | Dec. | March. | June. | Sept. |
| Derby, Leics., Notts., Northants, and Essex | 17.7 | 17.6 | 18·8 | 20.6 | 20.3 |
| Lancs. (excl. N.-W. Coast), Denbigh, Flint, and Cheshire | 5.8 | 4.7 | 6.5 | 6.4 | 6.9 |
| Lincolnshire | 8 | 8.5 | 10 | 8.4 | 9.3 |
| North-East Coast | 15.6 | 16.1 | 16·4 | 17 | 17.6 |
| Scotland | 5 | 5.8 | 5.0 | 6.9 | 7 |
| Staffs., Shrops., Worcs., and Warwicks. | 4 | 4.6 | 4·6 | 4.5 | 5 |
| South Wales and Monmouth | 9.6 | 11 | 11 | 11 | 10 |
| Sheffield | 2 | 2 | 2 | 2 | 2 |
| North-West Coast | 6.6 | 7.4 | 8 | 8 | 7 |
| TOTAL | 74.3 | 77.7 | 83·2 | 84.8 | 85.1 |

The following companies have furnaces in course of construction or rebuilding:—J. Lysaght's Scunthorpe Works; South Durham Steel & Iron Company, West Hartlepool Works.

# *ECSC Steel Production Breaks Record*

STEEL production within the European Coal and Steel Community in October reached the record level of 6,400,000 metric tons—representing an annual output of 77,000,000 tons annually, as compared with a 1959 annual production figure of 63,100,000 tons.

Orders for rolled steel placed in member countries of the Community in October totalled 4,319,000 tons, compared with 3,948,000 tons in the previous month, and 4,881,000 tons in October last year. Over the first 10 months of 1960 orders were 5.3 per cent. higher than in the corresponding period of 1959. An increase of 13.7 per cent. in the home orders and of 14.8 per cent. in inter-ECSC orders more than compensated for a fall of 21.7 per cent. in orders from non-ECSC countries. At the beginning of September, orders on hand with ECSC suppliers stood at 13,688,000 tons, compared with 12,122,000 tons in 1959.

The High Authority of the ECSC has announced its approval of a $26,000,000 project of the Hütten und Bergwerke Rheinhausen, AG, ferrous metals producer of west Germany, for the erection of new ingot production units and a plant for medium iron qualities.

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TELEPHONE NUMBER of the Stanton Ironworks Company, Limited, Ilkeston, near Nottingham, has been changed to Ilkeston 2161.

# Jubilee Year Difficulties for Hale & Hale

IN his review of the golden jubilee year of Hale & Hale (Tipton), Limited, ironfounders, etc., the chairman, Mr. R. C. Leppington, speaks of trading difficulties, due to lower prices, despite a steady increase in business during the early part of the year which ended on August 14, 1960.

With the completion of the rotary furnace bay, production from the open-hearth furnaces has ceased. A new mechanized moulding plant has also been completed. Production losses were inevitable during the changeover and as the new plant came into operation only halfway through the trading year, little benefit was felt. The new melting plant is now producting a first-class material which is being absorbed by the extended mechanized unit.

Unfortunately, states Mr. Leppington, the subsidiary companies have had a bad year, with the exception of Hale Enamellers, Limited. Special attention is being paid to the subsidiaries with a view to diversification and increased efficiency, in order that they may contribute to the profits of the group.

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Mr. ARCHIBALD SHARP, who was manager of Michael Colliery (Fife) for more than 40 years, has died at the age of 93.

*Coalfield News*

## Christmas Payments for Six Bells Dependants

FIRST payment from the Six Bells Disaster fund to dependants of the 45 men killed will be made before Christmas. The sum received to date with accrued interest amounts to nearly £97,500 and it is expected that the final figure will reach £100,000. The fund will be administered by the Public Trustee for the benefit of 41 widows, 56 children, and other dependants.

Widows will each receive weekly payments totalling £90 a year and children will receive £67 10s. A contingency fund of approximately £10,000 has been reserved to assist with apprenticeships, scholarships, or further education grants to child beneficiaries. Provision is also made for cases of undue hardship for dependant families. Payments to widows and orphans will be reviewed at the end of three years in the light of the investment programme position at that time.

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AFTER 52 YEARS at Waterhouses Colliery (Co. Durham), Mr. Ernest Raper retired last week.

MR. WILLIAM PINDER has retired after 51 years in the coal industry, 50 of them at Horden Colliery (Co. Durham). He had been an overman since 1947.

EXECUTIVE of the Yorkshire Winding Enginemen's Association, which is to be expelled from affiliated membership of the National Union of Mineworkers, has decided that the association shall remain independent.

AFTER 53 YEARS at Trimdon Grange Colliery (Co. Durham), Mr. Thomas Pollard has retired. He first went down the pit when he was 12 and was a deputy for 17 years. He has served on the miners' lodge committee and on the colliery welfare committee.

NORTHUMBERLAND MINERS have undertaken to maintain the Montagu Pit Disaster Fund for as long as there are dependants entitled to benefit from it. The fund was started in 1925 when 38 miners were killed in an inrush of water at the pit and at the outset amounted to £30,000.

WHILE TRYING to retrieve a spare piece of timber from under some waste, Mr. John Winning (54), a miner, was killed in a fall at Orgreave Colliery (Yorks). It was stated that the place where the accident happened was adequately timbered and looked safe. The inquest jury returned a verdict of Accidental Death.

FOR THE FIRST TIME overall productivity in the Durham Division of the NCB has exceeded 23 cwt. The average of 23.09 cwt. per manshift reached in the 46th week, is 0.23 cwt. more than the previous week, which was a record. In the corresponding week of 1959 overall OMS averaged 22.1 cwt. and at the face, 66.19 cwt., against 64.29 cwt. in the same week of 1959.

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NEWALL ENGINEERING COMPANY, LIMITED—Mr. W. K. Temple, has joined the board. He became general manager of the Peterborough works in 1946 and chief engineer in 1949 and has been engaged in the development of the company's range of machine-tools. He will continue to deal with technical matters for the group.

## *Coal Output 250,000 Tons Above Average*

OUTPUT of saleable coal, both deep-mined and open-cast, is now running well above the average for the first 47 weeks of the year. Production last week totalled 3,973,500 tons, slightly more than the previous week, and nearly 250,000 tons more than the average weekly output. Coal consumption is now nearly 8,000,000 tons more than in the comparable period of 1959 and undistributed stocks are now under 32,000,000 tons.

There were 585,000 wage-earners on colliery books on November 19, against 637,700 on November 21, 1959, the numbers engaged at the coal face being 221,000 and 246,000 respectively. Total absenteeism (all workers) in the week ended November 19 was 14.05 per cent., compared with 14.20 per cent. in the week ended November 21, 1959. Output at the face was 4.078 tons and overall 1.440 in the week ended November 19, compared with 3.872 and 1.388 tons in the week ended November 21.

The following tables gives (in tons) the output of saleable mined coal by division in the week ended November 26, and the tonnage lost through all causes (holidays, disputes, and go-slows):—

| Division. | Week ended November 26, 1960. | | Week ended November 28, 1959. |
|---|---|---|---|
| | Total output. | Tonnage lost. | Total output. |
| Scottish .. .. | 350,700 | 6,700 | 384,800 |
| Northern (N&C) .. | 245,500 | — | 261,500 |
| Durham .. .. | 474,600 | — | 487,300 |
| North-Eastern .. | 845,200 | 21,600 | 863,200 |
| North-Western .. | 255,700 | 2,400 | 283,300 |
| East Midlands .. | 908,700 | 200 | 934,200 |
| West Midlands .. | 289,300 | 200 | 314,200 |
| South-Western .. | 392,800 | 3,500 | 424,800 |
| South-Eastern .. | 32,500 | — | 33,800 |
| Great Britain— | | | |
| Deep-mined coal .. | 3,795,000 | 34,600 | 3,987,100 |
| Other deep-mined (including licensed mines) .. | 38,500 | — | 58,500 |
| Open-cast coal .. | 140,000 | — | 173,400 |
| TOTAL .. .. | 3,973,500 | 34,600 | 4,219,000 |

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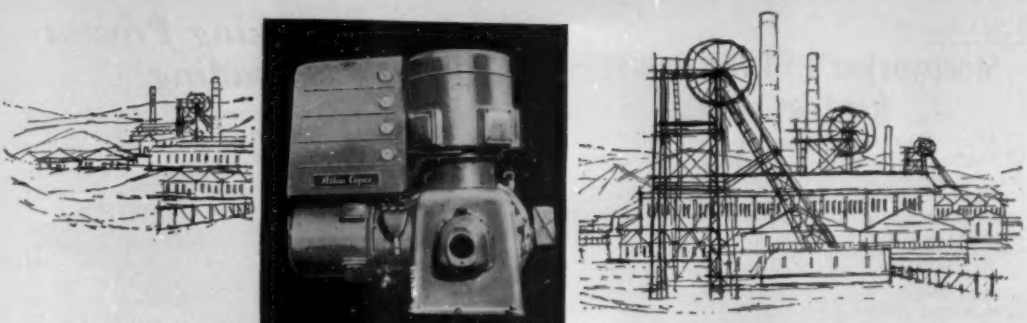
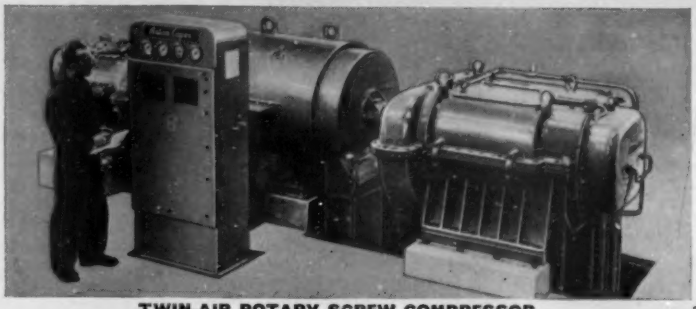
## Russian Machine-tool Order for David Brown Group

DEPUTY managing director of the David Brown Corporation, Limited, machine-tool makers, of Huddersfield, Mr. Allan Avison, returned last Friday from a trip to Russia with an order worth nearly £500,000 for precision gear-hobbing machines. The contract was won in the face of competition from West Germany and Russia itself. Mr. Avison hopes to return to Russia next year to discuss outstanding offers worth about £250,000.

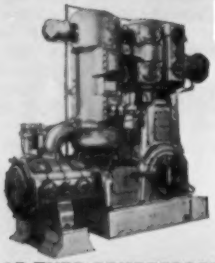
Shipments for the present order, believed to be the most valuable so far received from Russia for gear-cutting plant, will begin in a year's time and will take two years to complete. The firm completed a contract for £250,000 with China for machines of a similar type 18 months ago.



ER6 COMPRESSOR



TWIN-AIR ROTARY SCREW COMPRESSOR



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*Law Cases*

# Steelworker's £4,787 Damages for Loss of Leg

SAID to have been three times a medallist in "Mr. Britain" contests, Mr. Thomas Strodder (40), former steelworker, was awarded £4,787 damages at Sheffield Assizes against his employers, the English Steel Corporation, Limited, Sheffield. The action followed a works accident two years ago which cost Mr. Strodder his right leg. Mr. Justice Hinchcliffe, making the award, described the plaintiff as "a man of courage and character." He had won a large collection of cups and other awards for his physique and became a physical training instructor to two football teams and a youth club.

The judge said Mr. Strodder has been employed as a drop stamper and while using a practice known as "chucking the tup," a piece of red-hot metal flew into his right leg severing an artery. He said that the practice, a dangerous one in his view, had grown up in the industry, and the employers had given no instructions to make the system of work safe. "I have come to the conclusion that the sysem was authorized in the sense that those in a superior position tolerated the practice, and it had gone on over very many years."

The firm denied negligence and alleged contributory negligence. The judge said: "It would be quite wrong for me to find the plaintiff guilty of any negligence."

Mr. Strodder is now a draughtsman with the firm.

### DAMAGES FOR INJURED WORKER

DAMAGES of £1,100 were awarded to Mr. Erling Frederick Brustad (30), at Monmouthshire Assizes for injuries he received in an explosion at Black-Clawson International, Limited, paper mill engineers, of Newport (Mon). Mr. Brustad, who was employed as a moulder at the foundry, received burns on his body as a result of an explosion at the works. It was stated that the claim was based on the psychological after-effects of the accident. Mr. Justice Pearson said that a psychiatric report showed that Mr. Brustad was of a nervous disposition and the accident had added to this complaint.

Mr. Brustad was also awarded £229 special damages for loss of wages.

### INJURED BY GIRDER

DAMAGES of £2,750 were awarded against the Davy & United Engineering Company, Limited, Darnall, Sheffield, at Sheffield Assizes to Mr. John Hissett, 47-year-old slinger, who fractured both feet when a 6-ton girder slipped from a stack at the firm's works in 1958. He claimed the firm was negligent.

Mr. Hissett said that as he gave instructions to the crane driver, the top girders on the pile began to tumble and fell on his feet. The firm denied negligence. Mr. Justice Marshall, giving judgment, said that the stack had not been securely built. Mr. Hissett was now unable to climb or run.

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CLAIM by Mrs. Phyllis Doreen Gauntlett (30), who alleged that she contracted dermatitis while working at Girling, Limited, brake manufacturers, of Cwmbran (Mon), was dismissed at Monmouthshire Assizes. Mr. Justice Pearson said he was satisfied that Mrs. Gauntlett had caught dermatitis, but not due to the firm's negligence.

# *LD Steelmaking Process is Spreading*

IN addition to the 21 steelworks already using the Austrian-developed Linz-Donawitz production process in various parts of the world, a further 35 LD plants are projected and in construction. The process, which accounts for over 56 per cent. of steel output in Austria itself, is now in use in four continents.

New plans for the utilization of the process have in the past fortnight been announced from a number of different quarters. India's oldest State-run steel plant, that at Bhadrevarthi, in Mysore, is to extend its annual capacity from 30,000 to 130,000 metric tons by use of new LD equipment; this project will be carried out in co-operation with the German companies Demag and AEG.

With Japan's fifth LD plant having opened at the Amagasaki steel site at Osaka earlier this month, a delegation from the Austrian steel group, VOEST, is already conducting negotiations in Tokyo for the opening of further such units. Mr. Katsura, president of the country's Iron and Steel Corporation, has announced in this context that Japan will use the process to raise annual steel output from its present level of 22,000,000 tons to a future 45,000,000 tons.

VOEST itself is to build an LD plant in Rumania's new steel complex at Galata. From Africa comes news that the South African Iron & Steel Industrial Corporation, Limited, is interested in starting negotiations with Austria aimed at the introduction under licence of the process at its new steelworks at Pretoria and Vanderbijlpark to double existing capacities there.

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# John Bedford to Form New Drilling Company

NEW company for the production of specialized rock drilling products is to be formed in the UK by John Bedford & Sons, Limited, steel and tool manufacturers, of Sheffield, and an oversea associate. Each company will subscribe 50 per cent. of the share capital and in John Bedford's case this will involve an investment of £50,000 during the next 18 months.

Mr. C. E. Holmstrom, the chairman, states that the 12 in. mill is now approaching full production and is making a valuable contribution to profits. During the year ended September 30, 1960, the reheating furnace for the mill was converted to oil firing and it is proposed to convert the 9 in. mill to oil during the current financial year.

In view of the company's large capital commitments and the additional finance needed, it is proposed in the near future to make a rights issue of 200,000 ordinary 5s. shares at 7s. 6d. per share.

Net profit was £71,522 (£48,150), after tax of £68,719 (£44,357), and the final dividend of 11 per cent. makes 15 (11) per cent. for the year.

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CASTROL INDUSTRIAL, LIMITED, will be the new title of Wakefield-Dick Industrial Oils, Limited, the UK marketing organization for industrial, marine, and electrical oils of Castrol, Limited, as from January 2, 1961. Last August the parent company changed its name to Castrol, Limited, from C. C. Wakefield & Company, Limited.

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AP9

# New Appointments in West Midlands NCB

VACANT position of planning engineer of the West Midlands Divisional Coal Board is to be assumed by Mr. A. W. Lomas with effect from a date to be agreed. In the past eight years Mr. Lomas has been successively planning officer and planning engineer of the Cannock Chase Area, for five years prior to which he was assistant to the Area planning engineer. Before this he had had extensive mining experience in the Cannock Chase coalfield and for a year he held an appointment as technical organizer and lecturer under the Derbyshire Education Committee.

The Divisional Board has also appointed Mr. E. Mawdsley manager of No. 2 Production Group, North Staffordshire Area (Sneyd, Deep Pit, and Wolstanton collieries). The present group manager, Mr. L. W. Fletcher, is to succeed Mr. J. Hebblethwaite as deputy Area production manager (operations) at the end of the year.

After service at various collieries in Lancashire, Mr. Mawdsley became manager of Mossfield Colliery in 1955, and a year later manager of Hem Heath Colliery, both in the North Staffs Area. Eighteen months ago he was appointed to his present post of agent/manager of Hem Heath Colliery.

## *"Unforseeable" Accident Killed Miner*

"IN a pit there is always danger, and while everyone wishes it could be foolproof it cannot be. There are bound to be accidents, but every effort is made to prevent them happening." Mr. W. H. Carlile, the Doncaster and District coroner, said this when he returned a verdict of Accidental Death on Mr. Stanley Thompson (43), a machine cutter, who was killed in a roof fall at Askern Colliery.

Mr. Thompson was trapped by the legs by a roof fall and while two other miners were attempting to rescue him the whole roof collapsed and he was suffocated. Mr. Carlile said that all the men appeared to be satisfied with the working conditions. "There were plenty of officials around and if anything could have been done they would have done it. It was an unfortunate accident that could not have been foreseen," he said.

## Raine Increases Output with Oxy-propane Cutting

SINCE oxy-propane cutting was introduced at the Delta works, near Newcastle-upon-Tyne, of Raine & Company, Limited, more rails and billets are being cut in less time by fewer men. The company uses rails and mild steel billets as raw materials to manufacture light railway rails and colliery equipment.

Mechanical and hydraulic breakers were replaced by five portable straight line cutting machines fitted with MC.12 cutting heads made by the British Oxygen Company, Limited, and a new working method was introduced. Previously 18 men worked in the cutting bay in round-the-clock shifts to keep pace with two rolling mills. Now 13 men working an eight-hour day cut sections in advance of mill requirements.

# *Imports and Exports of Mining Machinery*

ACCORDING to Board of Trade returns, mining machinery (other than portable power tools) valued at £69,919 was imported during October, compared with £89,907 in October, 1959. Imports in the first 10 months of this year were valued at £926,574 against £1,195,428 in the corresponding period of last year.

The appended table contains figures of export values of mining and well-drilling machinery in October and values for the first 10 months of this year and last.

| Destination. | Month ended Oct. 31. | Ten months ended October 31. | |
|---|---|---|---|
| | 1960. | 1959. | 1960. |
| | £ | £ | £ |
| Union of South Africa .. .. | 34,495 | 472,427 | 391,123 |
| Rhodesia and Nyasaland .. | 25,734 | 110,312 | 152,712 |
| India .. .. .. .. | 97,332 | 1,206,850 | 970,224 |
| Australia .. .. .. .. | 37,302 | 243,391 | 330,125 |
| Canada .. .. .. .. | 27,238 | 206,621 | 253,823 |
| Trinidad .. .. .. .. | 5,795 | 310,515 | 281,537 |
| Other Commonwealth countries and Eire .. .. .. .. | 25,120 | 1,113,650 | 893,718 |
| Netherlands .. .. .. | 7,416 | 174,809 | 128,052 |
| France .. .. .. .. | 13,414 | 127,753 | 149,790 |
| Venezuela .. .. .. .. | 1,149 | 166,679 | 94,832 |
| Other foreign countries .. .. | 289,741 | 3,766,040 | 2,503,238 |
| TOTALS | | | |
| Well-drilling machinery— | | | |
| Petroleum .. .. .. .. | 151,965 | 4,031,715 | 2,091,425 |
| Other .. .. .. .. | 29,126 | 292,362 | 405,421 |
| Mining machinery (excluding portable power tools)— | | | |
| Coal-cutters, power operated— | | | |
| Complete .. .. .. | 30,779 | 409,385 | 427,379 |
| Parts .. .. .. .. | 57,605 | 519,646 | 643,278 |
| Conveyors, underground— | | | |
| Complete and parts .. .. | 45,901 | 918,361 | 835,492 |
| Winders, power operated— | | | |
| Complete .. .. .. | 22,143 | 92,857 | 136,834 |
| Parts .. .. .. .. | 21,444 | 229,059 | 259,867 |
| All other .. .. .. .. | 205,773 | 1,405,662 | 1,349,478 |
| TOTAL .. .. .. .. | 564,736 | 7,899,047 | 6,149,174 |

## Restore Cuts Say Small Mine Owners

COAL shortage in the area is forecast in a few years by the South Wales and Monmouthshire Small Mines Association because of the increasing demand by expanding industries, decreasing coal stocks, and a shortage of miners in the pits. The association is to ask the South-Western Divisional Coal Board to restore output cuts imposed last April. Another cut is due in January, but in view of the changing situation the association is to try and get its quota raised.

Due to the restrictions 50 mines closed and 800 miners lost their jobs. There are now 150 small mines employing 1,400 men in the area.

FIRST PERSON in industry to be convinced of the need to be constantly on guard against the possibility of accidents should be the general manager, said Mr. W. A. Gay, of the Royal College of Science and Technology, addressing the local Industrial Accident Prevention Group in Glasgow recently. With the backing of the general manager, the accident prevention officer would be able to present a far more powerful case to other members of the staff, he said.

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# NEWS IN BRIEF

NEARLY A THIRD of the total labour force of 22,000 at the Belfast shipyards of Harland & Wolff, Limited, will become redundant during the first six months of next year.

COAL INDUSTRY tribunal in Sydney rejected, on Monday, a union claim for a 35-hour week for colliery workers, but increased their annual holiday from three weeks to four.

MORE THAN 500 members of the National Union of Blast Furnacemen at John Lysaght's Scunthorpe Works, Limited, have left the union as a protest over a delay in negotiating bonus money.

ITALIAN TRACTOR CONCERN, G. Landini & Figli, SPA, has been bought by Massey-Ferguson, Limited, thus affording the company entry into the growing Italian farm and industrial machinery market.

DUTCH PRODUCERS have reduced the prices of ships' plates by introducing a time-limited rebate for certain qualities of plates 4.76 mm. and over. The rebates are between 1.5 per cent. and 7.4 per cent.

BLAST-FURNACE PLANT with an annual capacity of 35,000 tons is to be built in southern Sumatra, in the Republic of Indonesia. Backed by Russian credit, the project is expected to be based on West German equipment.

VERDICT of Accidental Death was returned at a Middlesbrough inquest on Mr. Ally Walker (61) who was killed when three steel plates fell on to him from a crane at the Cleveland works of Dorman, Long & Company, Limited.

NEGOTIATIONS are in progress in Uganda to establish a steel rolling mill at Jinja. Full details have not yet been announced, but it is understood that the project is well into the planning stage and will involve a capital investment of £600,000.

ACCORDING TO US STATISTICS, a record amount of steel was produced in the world over the first nine months of the current year. Production totalled some 270,400,000 metric tons, compared with only 239,000,000 tons for the corresponding period of 1959.

SERVICE INSPECTION SCHEME has been introduced by Bowmaker (Plant), Limited, under which the company's inspectors will instruct operators in the maintenance of Caterpillar machines, carry out minor adjustments, and prepare a comprehensive inspection report.

KAISER ALUMINIUM & CHEMICAL CORPORATION is to take over the role, previously held by British Aluminium, Limited, of an equal partner with Consolidated Zinc Corporation, Limited, which is establishing a £100,000,000 Australian aluminium industry.

NEW BRANCH showroom, offices, and warehouse at Manchester of Charles Churchill & Company, Limited, machinery and tool merchants, are now in full operation. The new premises are at 2-12, The Crescent, Salford 5, Manchester (telephone: Pendleton 1382).

PLANT for the production of special steel qualities is to be established in Belgium by the Espérance-Longdoz steel group in co-operation with Allegheny Ludlum Steel Corporation, Pittsburgh, US. The investment needed for the project is estimated at 700,000,000 Belgian francs.

AGREEMENT has been signed between Davey, Paxman & Company, Limited, Colchester (Essex), and Alco Products, Inc. (formerly American Locomotive Company), New York, under which the two companies will collaborate on diesel engine design and manufacture for world markets. Technical "know-how" on their respective engines will be exchanged by the companies and Davey Paxman will have the right to make and sell Alco engines outside the US, while Alco will have the same rights over Davey Paxman engines in the US.

MARKETABLE PRODUCTION of coal in South Africa totalled 31,500,000 tons during the first nine months of 1960. This was 1,400,000 tons higher than the corresponding total of last year. Coal sales, at 31,400,000 tons, were also up on last year's turnover of 29,400,000 tons.

ALL-WELDED steel pipe bridge, 146 ft. long and weighing 36 tons, was lifted into position over the river separating the Calder and Windscale works of the Atomic Energy Authority in two hours, recently. It was prefabricated in three sections by John Booth & Sons (Bolton), Limited.

THERE IS NO CHANGE in the trend of industrial production, the Treasury announced on Tuesday. The production index compiled by the Central Statistical Office is expected to remain at 120 or 121 for October. Apart from a fall of one point in June it has remained at 121 since April.

NEW OFFICE BUILDING in London, W.1, leased by Baker Perkins, Limited, manufacturing engineers, etc., of Peterborough, will be ready for occupation in mid-1961 when the staff of Baker Perkins (Exports), Limited, and the sales office staff will move from the present premises in Kingsway and Piccadilly.

PORTUGUESE COMPANY has been established by the English Electric Company, Limited. It will trade under the name of English Electrica de Portugal and will ensure the continuity of English Electric's agency arrangements in the country, which are regarded as of major importance to the company's exports.

THE 42 member companies of the Ruhr coal-mining employers' association are to raise DM. 25,000,000 (some £2,100,000) as the Ruhr coal industry's share in the German industrial development fund. The entire west German mining industry is to raise some DM. 40,000,000 for the fund and the country's ferrous metals industry is contributing an estimated total of DM. 100,000,000.

TODAY (FRIDAY) is the seventh anniversary of the incorporation of the National Industrial Fuel Efficiency Service. Assistance has now been provided to some 6,000 factories, non-industrial premises, and local authorities. The outcome of this work has been a substantial reduction in fuel consumption—about 20 per cent. overall—a lowering of production costs, and a steady increase in the production capacity of many factories.

FIRST of five generators manufactured by Associated Electrical Industries, Limited, to supply a total of 450 mW electric power to the Punjab and the adjoining states of Rajasthan and Delhi has been commissioned by the Governor of the Punjab at Bhakra, on the river Sutlej, some 200 miles north of Delhi. The second generator will be commissioned in February, 1961. All five generators to be housed in Bhakra power station have been delivered and the station is nearing completion.

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Mr. CHARLES SAMUEL CHERRY, partner in John Cherry & Sons, pump makers, of Beverley (Yorks) has died at the age of 88.

# * Use Refractory Concrete for Furnace & Boiler Foundations

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AP 3/1393

# CURRENT PRICES OF IRON AND STEEL

*(Delivered, unless otherwise stated)*
December 1, 1960

## PIG-IRON

**Foundry and Forge Iron.**—No. 3 iron, Class 2, Middlesbrough, £21 17s.; Birmingham, £21 9s. 3d., 10-ton lots or over.

***Low-phosphorus Iron.**—Over 0·10% to 0·40% P, 10-ton lots or over, £23 5s., delivered Birmingham, £23 10s., delivered Grangemouth.

***Basic Pig-iron.**—Delivered in Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leics, 10-ton lots or over, £20 3s.

**Hematite.**—Si less than 2%, S & P 0·03-0·05%, 10-ton lots or over; N.-E. (local iron), £23 19s.; Scotland (Scotch iron), Zone S.1, £24 5s. 6d.; Sheffield, £25 9s.; Birmingham, £25 13s.; Wales (Welsh iron), £23 19s.

**Refined.**—Cylinder and refined irons, South Zone, £25 9s., North Zone, £25 6s. 6d. Refined malleable, max. 0·10% P, South Zone £26 9s., North Zone £26 6s. 6d.

## MANUFACTURED IRON

*(Bar basis, 2⅝ in. to ¾ in.)*

CROWN IRON: England and Wales (Zone 1), £48 10s.; Scotland, £48 5s.; Ireland, f.o.q. Belfast, £50 7s. 6d.; all other Northern Ireland ports, £50 10s., f.o.q. Cable iron, £1 extra.

## SEMI-FINISHED STEEL

**Re-rolling Billets, Blooms, and Slabs.**—BASIC: Soft, u.t., 100 tons and over, £31 15s. 6d.; tested, 0·08-0·33% C, 100 tons and over, £32 5s. 6d.; hard (0·41-0·60% C), 50 tons and over, £33 17s.; silico-manganese, 50 tons and over, £42 16s. 6d.; free-cutting steel up to 0·25% C, 50 tons and over, £35 4s. 6d. SIEMENS-MARTIN ACID (50 tons and over): Up to 0·25% C, £40 11s.; silico-manganese, £43 4s.

**Billets, Blooms, and Slabs for Forging and Stamping.**—Lots of 50 tons and over. Basic, soft, up to 0·33% C, £37; basic, hard, over 0·41 up to 0·60% C, £38 2s. 6d.; acid, up to 0·25% C, £41 14s.; acid silico-manganese, £44 17s.

**Alloy Steel** (25 tons and over).—BILLETS, 3 in., up to and including 10 in., for re-rolling, 0·6/1% Ni, £46; Ni 2·75/3·75%, Cr 0·5/1·10%, £72 17s.; Ni 2·75/3·75%, Cr 0·5/1·3%, Mo. 0·2/0·65%, £83 7s. BARS: 1 in. dia. and up, nickel, £66 7s.; nickel-chrome, £97 1s.; nickel-chrome-molybdenum, £109 14s.

**Other Semi-products, etc.**—Forging ingots, up to 0·60% C, £31 12s. 6d. f.o.t.; tube billets, 50 tons and over, £39 10s.; shell steel billets for direct forging, up to and including 0·33% C, 100 tons and over, £37 15s.; tin bars and sheet bars, 50 tons and over, £32 10s. Wire rods, 3g. to 4g. (all areas except Birmingham, Scotland, Southern Joint Area, and Northern Ireland): Soft basic, 50 tons and over £39 17s.; hard basic, 50 tons and over, £43 8s.; free-cutting, up to 0·25% C, 50 tons and over, £45; acid, up to 0·75% C, 50 tons and over, £54 6s. 6d. Stainless steel billets, 3 in. and larger, 10 tons and over, Austenitic, £219 10s.; martensitic, £131 10s.

## FINISHED STEEL

**Heavy Products** (50 tons and over).—Mild-steel plates, ordinary qualities, N.-E. Coast and Northern Joint Areas and Central Scotland, £40 7s.; medium plates, all areas of England and Wales, £43 16s. 6d.; boiler plates, N.-E. Coast and Northern Joint Areas and Central Scotland, £42 17s.; floor plates, N.-E. Coast, £41 16s. Sections (N.-E. Coast, Midland, and Northern Joint Areas, and Central Scotland): Angles, £38 1s. 6d.; bars (rounds and squares), £40 11s. 6d.; flats, £38 6s. 6d.; joists, £37 17s. 6d.

**Rolled and Re-rolled Steel Products.**—N.-E. Coast, Midland, Northern Joint, and South Wales Areas, and Central Scotland, 50 tons and over: Angles and tees, 4 in. and under, £40 18s. Channels, 3-in. web and under, £40 18s. Flats, 5 in. wide and under, and rounds and squares, under 3 in.: Untested soft basic, £39 1s.; free-cutting, £44 9s. 6d.; hard basic, £41 19s. 6d.; Siemens-Martin acid, £49 12s. 6d.; spring steel, basic, £44 4s. 6d.; spring steel, acid, £53 11s. Glazing tees, £47 0s. 6d. Sash and casement sections, £43 13s. 6d. Gate channels, £50 17s. 6d. Ferro-concrete bars (10 tons to under 500 tons), £39 10s.

**Sheets and Strip.**—Uncoated strip mill coils, hot rolled, under 3 mm. to 12g., mill run, mill edge, 25 tons to under 50 tons, £43 16s.; cold reduced, 17/20g., side trimmed, skin passed, £49 16s. Black sheets, 24g., 10 tons and over, £57 14s. 6d.; galvanized corrugated sheets, 24g., 10 tons and over, £67 18s. Cold-rolled steel strip, coils, hard temper, not annealed, 20 tons and over, £54 5s. Hot-rolled hoop and strip, u/t soft basic, 100 tons and over, £38.

**Tinplates.**—Cold reduced, hot dipped, 15 tons to under 50 tons, 66s. 8d. per basis box of 108 lb., f.o.t., makers' works. Cold reduced electrolytic, 59s. 9d. per basis box.

**Colliery Rails and Arches.**—Arches, 4 in. × 2½ in. × 2 in., re-rolled, £38 15s.; 3 in. × 3 in., re-rolled, £39; 3½ in. × 3½ in., re-rolled, £40 7s. 6d.; 4 in. × 2½ in. × 2 in., prime £43 7s. 6d. Other sections, prime, £43 12s. 6d. Extra fish-plates, £52 10s. Cambered girders, 4 in. × 2½ in. × 2 in., re-rolled, £37 9s.; 3 in. × 3 in., re-rolled, £37 11s. 6d.; 3½ in. × 3½ in., re-rolled, £38 18s. 6d.; 4 in. × 2½ in. × 2 in., prime, £42 4s. 6d. Other sections, prime, £42 7s. Benk bars, standard type, prime material, all thicknesses, £38 11s. "W" type bars, prime steel, all thicknesses, £41 1s. Standard type, re-rolled, up to ⅜ in., inclusive, £36 3s. 6d.; over ⅜ in. to ½ in., inclusive, £37 8s. 9d. "W" type bars, re-rolled, up to ⅜ in., inclusive, £38 13s. 6d.; over ⅜ in. to ½ in., inclusive, £39 18s. 6d. Light rails, flange, 25 lb. and under, prime, £40 17s. 6d. Flange rails, 25 lb. and under, re-rolled, £39 15s. Fishplates, £50 12s. 6d.

**Bright Steel** (50 tons and over).—Bars, no analysis or test, £53 5s.; flats, untested, £71.

**High-speed Tool Steel.**—Finished bars, 5% cobalt, 10s. 10d.; 14% tungsten, 6s. 11d.; 18% tungsten, 7s. 9d.; 22% tungsten, 9s. 2d.; 4/6 quality molybdenum tungsten, 6s. 3d.; 6/6 quality molybdenum tungsten, 6s. 5d.; 5/6/2 quality molybdenum tungsten vanadium, 6s. 7d. per lb.

**Rails, etc.**—F.B. rails, heavy 75 lb. to under 90 lb., 500 tons and over, f.o.t., £39 15s.; fishplates for rails 80 lb. and heavier, 50 tons and over, f.o.t., £55 11s.; soleplates, f.o.t., 100 tons and over, £51. Light flange rails, 25 lb. and under, d/d N.-E. Coast, Midland, Northern Joint, and South Wales Areas, and Central Scotland, 50 tons and over, £40 17s. 6d.; fishplates for light rails, 50 tons and over £50 12s. 6d.

## BLAST-FURNACE COKE

*(F.O.T. at Ovens)*

DURHAM AND NORTH-EAST COAST: 177s. 6d. SOUTH WALES: 174s. 7d. NOTTS AND DERBY: 150s. 7d. LANCASHIRE: 162s. 7d. STAFFORDSHIRE: 156s. 2d. YORKSHIRE: 155s. 1d. SCOTLAND: 187s. 11d.

(All prices are subject to quality differentials.)

## STEELWORKS SCRAP

(Plus 5 per cent. in the case of sales by merchants.)

| | Scot-land. | N.-E. Coast. | Mid-lands. | Shef-field. | Lancs. | S. Wales (East) | S. Wales (West) |
|---|---|---|---|---|---|---|---|
| | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. |
| Heavy steel scrap* .. .. | 229 3 | 228 3 | 220 0 | 226 3 | 226 3 | 227 3 | 232 3 |
| Heavy mixed scrap* .. .. | 207 3 | 206 3 | 198 6 | 204 3 | 203 9 | 205 3 | 210 3 |
| Heavy steel turnings† .. .. | 179 9 | 179 0 | 169 9 | 176 9 | 174 3 | 177 0 | 180 0 |
| Heavy cast iron† | 206 9 | 203 9 | 208 0 | 204 3 | 189 3 | 199 3 | 205 9 |
| Cast-iron borings† | 160 3 | 157 3 | 157 0 | 159 9 | 157 3 | 159 6 | 164 6 |

* Basis 500-ton lots in England and Wales and 250 tons and upwards in Scotland, delivered.

† Not less than 250 tons in England and Wales, 100 tons in Scotland.